STUDY ON OUTCOME OF ACUTE CHOLECYSTITIS

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BY

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Dedicated

to

my family

&

Teachers

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ABBREVIATIONS

TG 07: Tokyo Guidelines 2007

TG 13: Tokyo Guidelines 2013

GSD: Gall Stone Disease

ACC: Acute Calculous Cholecystitis

PCD: Percutaneous Drainage

CAD: Coronary Artery Disease

CKD: Chronic Kidney Disease

LC: Laparoscopic Cholecystectomy

AC: Acute Cholecystitis

ICU: Intensive Care Unit

PT/INR: Prothrombin Time/International Normalized Ratio

WBC: White blood cells

CRP: C Reactive Protein

CT: Computed Tomography

HIDA: Hepatobiliary iminodiacetic acid

RUQ: Right Upper Quadrant

RCT: Randomized controlled trials

ASA: American Society of Anaesthesiologists

APACHE II: Acute Physiology and Chronic Health Evaluation II

ABSTRACT

Introduction: A Prospective study on outcome of acute cholecystitis and plan of therapy based on certain parameters which decide the severity gradings such as mild, moderate or severe acute cholecystitis according to Tokyo Guidelines(TG13).

Aim of study: To determine the outcome in patients with Acute Cholecystitis.

Materials and methods: A prospective study was conducted at Dayanand Medical College and Hospital, Ludhiana from 1st Nov, 2018 to 31st Oct, 2019. 100 patients with the diagnosis of acute cholecystitis were enrolled and classified using severity grading according to TG13. Based on treatment modality, the patients with less severity and less comorbidity were selected for cholecystectomy and critically ill patients were selected for PCD followed by laparoscopic cholecystectomy in same admission(early) or interval (delayed) cholecystectomy.

Results: 100 patients were included in the study (grade 1 mild,12; grade 2 moderate, 55; grade 3 severe, 33). In higher severity grading, patients who underwent percutaneous cholecystostomy had a longer hospital stay than those who received treatment with antibiotics or surgery. In higher grades, patients who underwent PCD followed by interval (delayed) laparscopic cholecystectomy had less intraoperative and post-operative complications in comparison to the patients who underwent PCD followed by same admission(early) laparoscopic cholecystectomy. Patients with complications, more severity grading and patients who had an ICU stay postoperatively, sequentially led to prolonged hospital stay. With conservative management, more was the overall medical cost of the patient, higher grade of acute cholecystitis is directly proportional to patient's morbidity in terms of complications and re- admissions.

Conclusion: Higher is the severity grading, more conservative is the management. PCD followed by delayed laparoscopic cholecystectomy was the appropriate treatment of choice, having less intraoperative and post-operative complications, reducing the procedure related morbidity of the patients with severe grades.

Keywords: TG13, severity grading, Percutaneous cholecystostomy drainage, laparoscopic cholecystectomy.

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INTRODUCTION

Gallstone disease (GSD) represents a significant burden for healthcare systems worldwide and is one of the most common disorders among patients presenting to emergency with abdominal discomfort. The prevalence differs not only between countries but also between ethnic groups. Age and gender also influence the prevalence of GSD.[1] Gallstones occur commonly in the Western world and prevalence of gallstones in India was found to be 6.12% in the adult population.[2] The overall incidence of gallstone disease was 18.8 % in women and 9.5 % in men. However, the prevalence of gallstone disease varies significantly between ethnicities.[3] Risk Factors include fatty diet, obesity, sedentary lifestyle, geriatric age group, female gender, oral contraceptive pills, and family history of gallstones.[4] The prevalence of gall stones is 2 to 4-fold higher in North Indians as compared to South Indian population.[5]

Acute cholecystitis is most often caused by gall stones. More than 80% of people with gall stones are asymptomatic. Acute cholecystitis develops in 13% of patients with symptomatic gall stones. Over 90% of cases of acute cholecystitis result from obstruction of the cystic duct by gall stones or by biliary sludge. Secondary bacterial infection with enteric organisms (most commonly Escherichia coli, Klebsiella, and Streptococcus faecalis) occurs in about 20% of cases. Sequalae leads to gangrenous cholecystitis, gall bladder perforation with peritonitis, emphysematous cholecystitis and cholecystoenteric fistulas.[6]

Uncomplicated cholecystitis most commonly presents as biliary colic which is episodic, severe and occurs in right upper quadrant or epigastric region. Biliary colic occurs in 1 to 4 % annually. Acute Calculous Cholecystitis (ACC) occurs in 10 to 20 % of untreated patients.[7] The probability of gallstone related events in patients with attack of ACC is 14, 19 and 29 % at 6 weeks, 12 weeks and at 1 year respectively. Recurrent symptoms involve biliary colic in 70 % while biliary tract obstruction occurs in 24 % and pancreatitis in 6 %

patients.[8] Clinically patients presents with tenderness and guarding in right upper quadrant with Murphy's sign positive. A palpable tender mass is felt usually when presentation is beyond 72 hours. ACC leading to sequalae can result in severe sepsis and organ failure. Fever with leukocytosis along with elevation of inflammatory markers is seen. Elevated serum amylase suggests concomitant gall stone pancreatitis or gangrenous cholecystitis. Abdominal ultrasonography is the most common imaging modality used to diagnose ACC (GB wall thickening with pericholecystic fluid).[9]

Mostly patients with ACC respond to conservative measures, Nil per oral, I/V fluids with antibiotics with adequate analgesia. About 20% patients require emergency intervention either in the form of percutaneous cholecystostomy and cholecystectomy depending upon the generalized condition of the patient.[6] The timing of surgery is under debate. Laparoscopic cholecystectomy in emergency settings if done within 72 hours is associated with less complication and conversion rates.[10] Patients with serious co morbidities and unfit for surgery can benefit from percutaneous cholecystostomy followed by cholecystectomy in same admission or interval cholecystectomy depending upon the optimization needed for anaesthesia. Percutaneous cholecystostomy is minimally invasive procedure done bed side under local anaesthesia in critically ill patients admitted in ICU after severe acute cholecystitis. This method of percutaneous drainage shows improvement in 25% patients following which cholecystectomy can be planned.[11]

Despite the relevant frequency of ACC, significant controversies remain regarding the diagnosis and management of ACC. The 2007 and 2013 Tokyo guidelines (TG) attempted to establish objective parameters for the diagnosis of ACC. However debates continue in the diagnostic value of single ultrasound (US) signs, as well as of laboratory parameters. With regard to the treatment of ACC, historically, the main controversies were around the timing of surgery. The need for surgery as compared to conservative management has been less investigated, particularly in high surgical risk patients. The

other major disagreements include: method and need to diagnose potential associated biliary tree stones during ACC, treatment options, type of surgery, definition and management of high surgical risk patients (with clarification of the role for cholecystostomy). While the TG has certainly improved the understanding of ACC, some criticisms have followed. Indeed, the references in the TG are outdated for some recommendations; the ACC scoring system has not been validated and it does not distinguish between suspected gallbladder inflammation and systemic signs of ACC. Finally, the conclusions are not clear because all the different therapeutic options are available for the same "cholecystitis severity grade".[12]

AIM AND OBJECTIVE

To determine the outcome in patients with Acute Cholecystitis.

REVIEW OF LITERATURE

In developed countries, the prevalence of gallstones ranges between 10 and 15% among the adult population while family history, genetic predisposition, ethnic background as well as female sex and the patients' age are independent factors contributing to their development. 1–4% of all patients with known cholelithiasis are suffering from biliary colic each year. Most gallstones remain silent but up to 25% become symptomatic in the form of cholecystitis, cholangitis, or biliary pancreatitis. Once a patient has developed symptoms or complications related to gallstones, surgical therapy remains the gold standard because of a high rate of medical re-admission due to the same symptoms or due to pancreatitis or cholecystitis within a discrete time frame. Furthermore, biliary colic is one of the most common precursors of more and even life-threatening gallstone-related complications.[13]

Patients with gall stones often develop acute cholecystitis (10-20%)[14] and it is among the frequent causes of abdominal emergencies. Around 70 to 80% patients proceed to surgical management while the remaining patients are managed conservatively in form of medical therapy and gall bladder drainage procedures such as percutaneous cholecystostomy or percutaneous aspiration. In early 2000s open cholecystectomy was the preferred approach[15] but now laparoscopic cholecystectomy is accepted as the gold standard treatment. However, the optimal timing of cholecystectomy remains controversial, especially in elderly comorbid patients.[16]

Severe acute cholecystitis if not managed properly can result in early death. Before 2006 there were no practical guidelines throughout the world for the management of acute cholecystitis. An international meeting was held in Tokyo on 1st and 2nd April 2006 with 29 experts from 22 countries alongwith Japanese experts working in the field of hepatobiliary and through a voting system guidelines were finalized as Tokyo guidelines 07 (TG07) for the diagnosis and assessing the severity and management of acute cholecystitis. These guidelines were on the basis of evidence based medicine.[17]

Several problems were encountered regarding the TG07 during the analysis and the most important was that the criteria for definite diagnosis were ambiguous and difficult to use. According to TG07 for definite diagnosis of acute cholecystitis one local sign and one systemic sign of inflammation has to be positive and imaging to be done if acute cholecystitis suspected clinically. But it was concluded that the term “definite diagnosis” could not be supported in current practice without positive diagnostic imaging studies i.e abdominal ultrasonography, CT scan and HIDA scan. In routine abdominal USG is the initial and the gold standard investigation for the diagnosis of acute cholecystitis.[12] Then from June 2011 to April 2012 three international meetings were held and Tokyo guidelines were revised and formulated as Tokyo guidelines 2013 (TG13).[17]

TG13 diagnostic criteria for acute cholecystitis[12]

A. Local signs of inflammation etc.

(1) Murphy’s sign, (2) RUQ mass/pain/tenderness

B. Systemic signs of inflammation etc.

(1) Fever, (2) elevated CRP, (3) elevated WBC count

C. Imaging findings

Imaging findings characteristic of acute cholecystitis

Suspected diagnosis: One item in A + one item in B

Definite diagnosis: One item in A + one item in B + C

TG13 severity grading for acute cholecystitis[12]

Grade I (mild) acute cholecystitis

Does not meet the criteria of ‘‘Grade III’’ or ‘‘Grade II’’ acute cholecystitis. Grade I can also be defined as acute cholecystitis in a healthy patient with no organ dysfunction and mild inflammatory changes in the gallbladder.

Grade II (moderate) acute cholecystitis

Associated with any one of the following conditions:

1. Elevated white blood cell count >18,000/mm^3
2. Palpable tender mass in the right upper abdominal quadrant
3. Duration of complaints >72 hr

4. Marked local inflammation (gangrenous cholecystitis, pericholecystic abscess, hepatic abscess, biliary peritonitis, emphysematous cholecystitis)

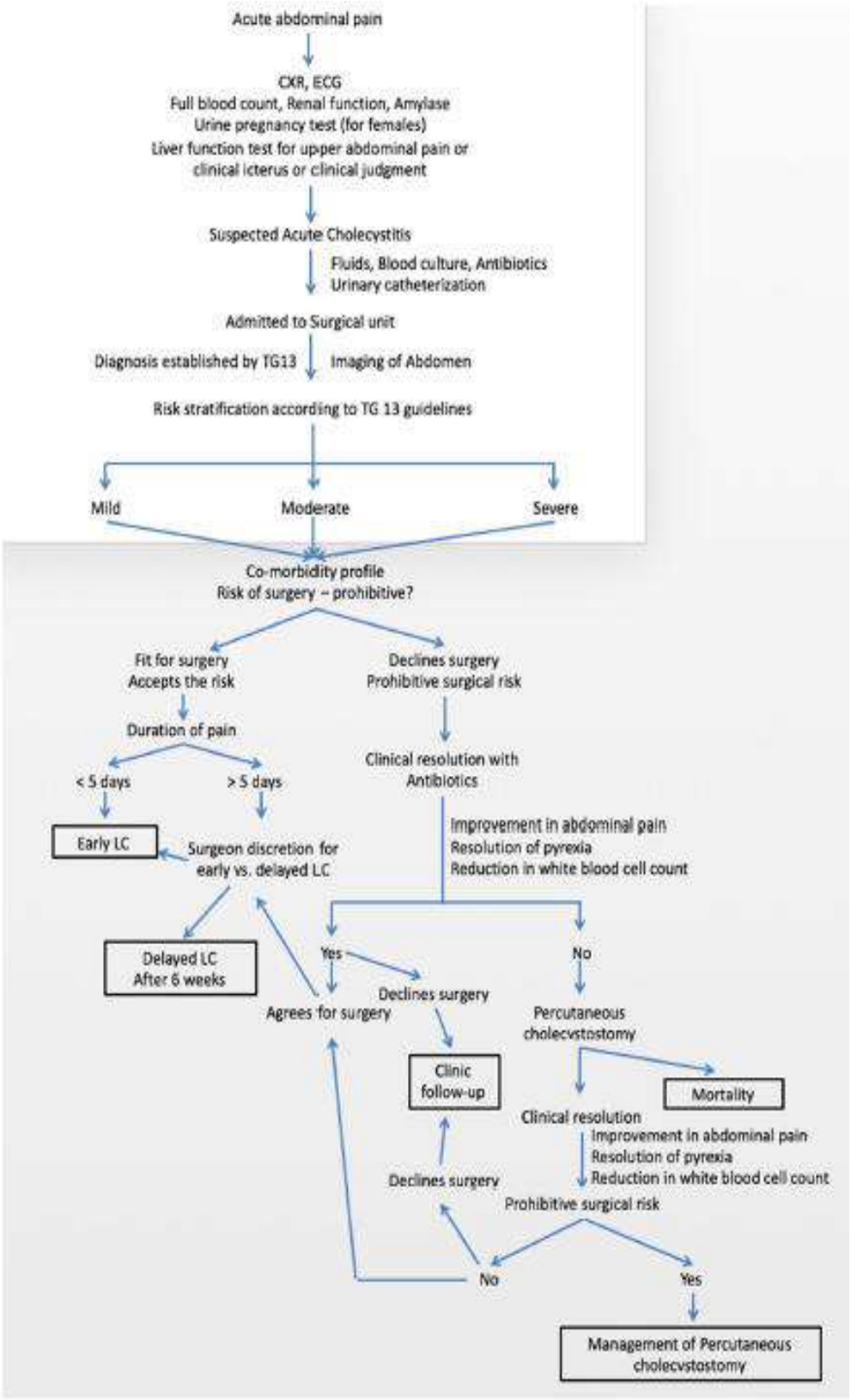
Grade III (severe) acute cholecystitis

Associated with dysfunction of any one of the following organs/systems:

1. Cardiovascular dysfunction: Hypotension requiring treatment with dopamine $\geq$5 ug/kg per min, or any dose of norepinephrine.
2. Neurological dysfunction: Decreased level of consciousness
3. Respiratory dysfunction: PaO2/FiO2 ratio <300
4. Renal dysfunction: Oliguria, creatinine >2.0 mg/dl
5. Hepatic dysfunction: PT-INR >1.5
6. Hematological dysfunction: Platelet count <100,000/mm^3

Laparoscopic cholecystectomy is the gold standard therapy for nonacute cholecystitis but its applicability for acute cholecystitis had been controversial for 10 years.[18] Patients with grade I acute cholecystitis are candidates for undergoing immediate laparoscopic cholecystectomy, those with grade II acute cholecystitis can undergo either early laparoscopic cholecystectomy or percutaneous transhepatic gallbladder drainage (cholecystostomy), and those with grade III acute cholecystitis are strongly recommended to undergo immediate cholecysostomy. The safety and optimal timing of laparoscopic cholecystectomy have been evaluated and the outcome has been good when cholecystectomy was performed early in the course of acute cholecystitis.[19] In critically ill patients with comorbid conditions surgical exposure adds on to the stress to the body thus making these patients unfit for cholecystectomy and the perioperative mortality rate was reported around 19%.[20-22] Thus a minimal invasive procedure was needed as an alternative that provides good therapeutic response and sail out the patient from sepsis. Thus cholecystostomy was performed.

Algorithm for the management of acute cholecystitis[23]



The first cholecystostomy was performed by Bobbs in 1867. In 1878 surgical cholecystostomy was described when Sims, Kocher and Keen each performed the procedure independently of one another and

only Kocher's patient survived.[24] The first ultrasound guided percutaneous cholecystostomy was performed in 1979 by Elyaderani and Gabriele in jaundiced patient.[25] In 1982 Radder attempted the procedure in patient with acute cholecystitis.[26] In 1983 Elyaderani et al[27] started performing usg guided cholecystostomy in acute cholecystitis patients. Shaver et al[28] further established the procedure and cholecystostomy was considered as minimal invasive procedure in surgically unfit patients.

There was some belief that percutaneous cholecystostomy was better tolerated than cholecystectomy in elderly septic or otherwise seriously ill patients, but no randomized controlled trials (RCTs) have been carried out to substantiate this. Studies conducted by Akhan et al[29], Johnson et al[30] and Sosna et al[31] regarding indications for cholecystostomy and outcomes in patients with acute cholecystitis treated with cholecystostomy. None of the studies were systematic and none compared the differences in outcome between treatment with cholecystectomy and cholecystostomy. Study conducted by Akyurek et al[32] in 38 sick patients showed success with cholecystostomy with 34 patients undergoing cholecystectomy after resolution of acute phase. Similar findings were observed in studies conducted by Ito et al[33] in 60 ill patients with improvement seen in 51 patients, Macri et al[34] done cholecysostomy in 27 patients with success seen in 25 patients. Study conducted by Al-Jundi et al[35] in 30 patients with severe acute cholecystitis and managed with percutaneous cholecystotomies. 27 patients showed clinical improvement within 5 days and 11 patients underwent subsequent cholecystectomy after 60 days.

Study conducted by Chikamori et al[36] in 62 complicated cholecystitis patients and patients were divided into 3 groups as per management strategies. He concluded that early scheduled cholecystectomy following cholecystostomy is a safe and effective therapeutic option in complicated patients. Kim et al[37] reported that the conversion rate to open cholecystectomy after 72 hr of admission following cholecystostomy vs non-cholecysostomy patients with acute cholecystitis was 15% (4/27) vs 23% (3/13). They concluded that

cholecysostomy did not significantly improve the outcome of LC for acute cholecystitis. On the other hand, Tseng et al[38] reported the usefulness of cholecysostomy before cholecystectomy for acute cholecystitis. Mo et al[39] reported that the conversion rate in cholecystectomy 2 to 5 days after cholecysostomy was 0% (0/7). Watanabe et al[40] reported similar results. Patterson et al[41] reported that the conversion rate in cholecystectomy with a mean of 36 days after cholecysostomy was 31% (4/13). Thus, the necessity of cholecysostomy before cholecystectomy for acute cholecystitis has not yet been established.

The study by Hatzidakis et al[42] was randomized and comprised 123 high-risk patients with acute cholecystitis. All patients fulfilled the ultrasonographic criteria of acute inflammation and had an APACHE II score ≥12. Percutaneous cholecystostomy guided by US or CT was done in 60 of 63 patients (95.2%) who comprised the cholecysostomy group. Sixty patients were conservatively treated. Resolution of symptoms occurred in 54 of 63 patients (86%). Eleven patients (17.5%) died. Seven patients (11%) were operated on because of persisting symptoms (n=3), catheter dislodgment (n=3), or unsuccessful cholecysostomy (n=1).

In a study conducted by Boland et al[43] eighty-two patients, 44 men and 38 women underwent percutaneous cholecystostomy. In 48 of 82 patients, significant improvement was shown in the clinical condition within 48 hrs disappearance of abdominal pain or tenderness (27), WBC count returning to normal (33), and the ability to discontinue vasopressor therapy. Twelve patients who initially responded to percutaneous cholecystostomy subsequently died of multiorgan failure after the procedure. Cholecystectomy, after recovery from the acute illness, was electively performed in 16 of 48 patients who responded to percutaneous cholecystostomy.

Paul Wright G et al[44] conducted study on 445 patients with acute cholecystitis. For surgical patients (n = 256), worsened outcomes with increasing severity grade were seen for conversion to open, operative duration, length of hospital stay and readmission. The

recurrence of acute cholecystitis while patients were waiting for cholecystectomy following conservative treatment ranges from 2.5% to 22%. In non-severe cases, acute cholecystitis recurred in 2% of patients within an 8- to 10-week waiting period, 6% of whom showed gallbladder perforation.

Wei-Chun Cheng et al[45] done a retrospective study on 103 patients with acute cholecystitis and their medical records were reviewed. They were all classified according to therapeutic modality, including early cholecystectomy and antibiotic treatment with or without percutaneous cholecystostomy. The impact of the Tokyo guidelines and the presence of comorbidities on clinical outcome were assessed. According to Tokyo severity grading, 48 patients were Grade I, 31 patients were Grade II, and 24 patients were Grade III. The Grade III patients had a longer hospital stay than Grade II and Grade I patients 15.2 days, 9.2 days, and 7.3 days, respectively.

KS Gurusamy et al[46] included two trials with 156 patients. The comparisons included in these two trials were percutaneous cholecystostomy followed by early laparoscopic cholecystectomy versus delayed laparoscopic cholecystectomy (n=70) and percutaneous cholecystostomy versus conservative treatment (n=86). There was no significant difference in mortality between the two intervention groups. There was no significant difference in overall morbidity between the two intervention groups. There was no significant difference in the proportion of participants requiring conversion to open cholecystectomy between the two intervention groups. The mean total hospital stay was significantly lower in the percutaneous cholecystostomy followed by early laparoscopic cholecystectomy group compared with the delayed laparoscopic cholecystectomy group.

Percutaneous Cholecystostomy is an effective tool with a high success rate and low morbidity and facilitates safe subsequent surgical treatment, especially for lap cholecystectomy. Some surgeons prefer percutaneous cholecystostomy preoperatively before cholecystectomy based on the results of previous studies[24] indicating that elective

cholecystectomy after percutaneous cholecystostomy may lower the conversion and complication rates of patients with complicated acute cholecystitis. However, several recent studies have reported that PC is associated with increased 30-day mortality, higher odds of death, higher morbidity rates, and higher total costs compared with cholecystectomy.[47,48]

The recommendation given by Takada et al[49] for percutaneous cholecystostomy in cases of severe (grade III) acute cholecystitis is generally accepted in clinical practice. In some institutes, preoperative cholecystostomy is performed based on the physician's preference or as an arbitrary indication based on the hospital's policy for delayed surgery especially for moderate or severe acute cholecystitis. In addition, with respect to moderate acute cholecystitis, the decision to perform percutaneous cholecystostomy depend largely on the patient's age, comorbidities, and ASA score rather than their response to initial medical management.

Complications are also significantly more common for patients with higher severity grades. Postoperative pathological findings of gangrenous cholecystitis and emphysematous cholecystitis have been found to be more severe in high grade cases. Complicated patients tend to stay longer in hospital with icu admissions and thus increasing the medical cost.[50] Thus this study aims to observe the outcomes in patients with acute cholecystitis which were graded according to Tokyo guidelines 13. On the basis of severity, patients age comorbid conditions decision to perform cholecystectomy or cholecystostomy followed by cholecystectomy was taken and outcomes of the therapeutic modality adopted was observed in form of conversion rates, complications, ICU/hospital stay and medical cost.

MATERIALS AND METHODS

SOURCE OF DATA

Patients admitted to general surgery ward in Dayanand Medical College and Hospital with diagnosis of Acute Cholecystitis from 1st Nov 2018 to 31st Oct 2019 were enrolled and classified using severity grading according to Tokyo guidelines 2013.

METHOD OF COLLECTION OF DATA

Inclusion criteria:

- Acute cholecystitis
- Complicated acute cholecystitis
- Acute on chronic cholecystitis
- Age >18 years old
- Concomitant cholangitis or mild pancreatitis (according to Atlanta classification)
- More than one management within one admission or subsequent admissions
- Acalculous cholecystitis

Exclusion criteria:

- Age <18 years old
- Hepatobiliary malignancy
- Moderate and severe pancreatitis (Atlanta classification)

Patient diagnosis was based on typical physical findings, systemic inflammation signs and abdominal imaging (abdominal ultrasonography and/or computed tomography). Based on treatment modality, the patients with less severity and less comorbidity were selected for cholecystectomy and critically ill patients were selected for percutaneous cholecystostomy followed by cholecystectomy in same admission or interval cholecystectomy. The decision to categorize the patients and procedure to be performed was decided on the basis of Tokyo guidelines 2013.

The criteria used are as follows:

Severity Grading for Acute Cholecystitis, According to Tokyo Guidelines[12]	
Grade	**Criteria**
Mild (grade 1)	Acute cholecystitis that does not meet the criteria for a more severe grade Mild gallbladder inflammation, no organ dysfunction
Moderate (grade 2)	The presence of one or more of the following: Elevated white-cell count (>18,000 cells per cubic millimeter) Palpable, tender mass in the right upper quadrant Duration >72 hr Marked local inflammation including biliary peritonitis, pericholecystic abscess, hepatic abscess, gangrenous cholecystitis, emphysematous cholecystitis
Severe (grade 3)	The presence of one or more of the following: Cardiovascular dysfunction (hypotension requiring treatment with dopamine at ≥5 µg per kilogram of body weight per minute or any dose of dobutamine) Neurologic dysfunction (decreased level of consciousness) Respiratory dysfunction (ratio of partial pressure of arterial oxygen to the fraction of inspired oxygen <300) Renal dysfunction (oliguria; creatinine level, >2.0 mg/deciliter) Hepatic dysfunction (prothrombin time–-international normalized ratio, >1.5) Hematologic dysfunction (platelet count, <100,000 per cubic millimeter)

Surgical procedures performed:

- Laparoscopic cholecystectomy
- Conversion to open cholecystectomy
- Open cholecystectomy
- Percutaneous cholecystostomy(PC)
- PC f/b interval cholecystectomy
- PC f/b same admission cholecystectomy

Complications:

Intraoperative complications:

- Bleeding from tissues adjacent to gall bladder
- Bleeding from cystic artery
- Iatrogenic perforations of gall bladder
- CBD injury
- Bleeding from anterior abdominal wall (port)
- Spilled gall stones
- Bleeding from ligaments of liver
- Colonic injury

Postoperative complications (BTW POD 1 – 7)

- Bleeding from abdominal wall cavity >100ml/24hrs
- Bile leak (>50) ml /24hrs
- Subhepatic collection
- Hematoma abdominal wall
- Recurrence of symptoms
- Pulmonary complications
- Lost gall stones (abscess)
- Surgical site infection

Postoperative hospital stay length

Sample Size: Patient admitted in DMCH, Ludhiana with Acute Cholecystitis in one year time period i.e. from 1st Nov, 2018 to 31st Oct, 2019.

Outcome: This study evaluated and assessed the duration of hospital/ICU stay, mortality/ morbidity rates, local/ systemic complications and medical costs for patients with definite diagnosis of Acute Cholecystitis according to Tokyo Guidelines 2013.

STATISTICAL ANALYSIS

Data were described in terms of range; mean ±standard deviation (± SD), frequencies (number of cases) and relative frequencies (percentages) as appropriate. For comparing categorical data, Chi square ($\chi 2$) test was performed and exact test was used when the expected frequency is less than 5. A probability value (p value) less than 0.05 was considered statistically significant. All statistical

calculations were done using (Statistical Package for the Social Science) SPSS 21version (SPSS Inc., Chicago, IL, USA) statistical program for Microsoft Windows.

OBSERVATIONS AND RESULTS

This prospective observational study was conducted on 100 patients who presented with diagnosis of acute cholecystitis to department of surgery at Dayanand Medical College and Hospital from 1st Nov 2018 to 31st Oct 2019. Patients were categorized into mild moderate and severe grades according to Tokyo guidelines 13. 12 patients were grouped under mild grade, 55 patients under moderate and 33 patients were under severe grading.

DEMOGRAPHIC PROFILE

1. AGE DISTRIBUTION

- Mean age of the patients: 54.97 (19-88 years)

Table 1: Age Distribution

Age	No. of Cases	Percentage
< 40	21	21.0%
41-60	43	43.0%
> 60	36	36.0%
Total	100	100.0%

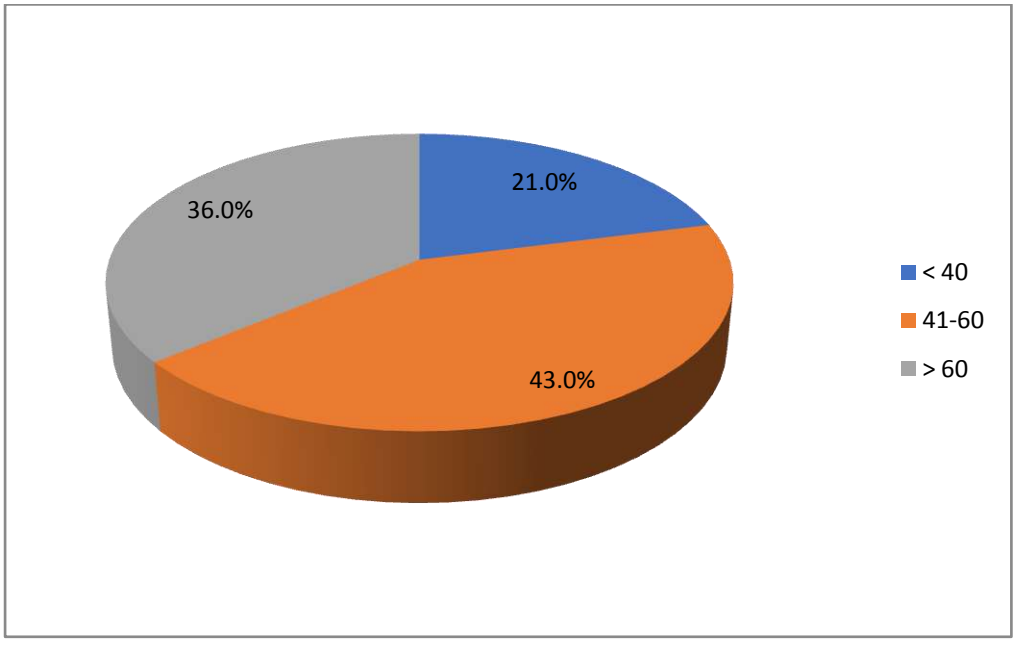


Figure 1: Age Distribution

2. GENDER

- Out of 100 patients 57 were males (57%)
- 43 patients were females (43%)

Table 2: Gender

SEX	No. of Cases	Percentage
Female	43	43.0%
Male	57	57.0%
Total	100	100.0%

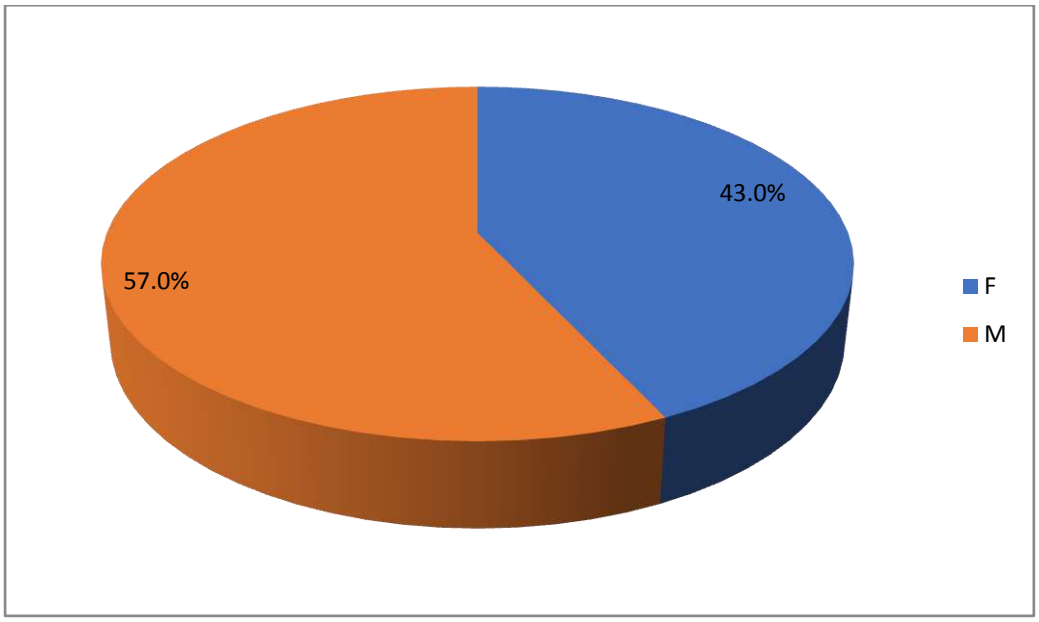


Figure 2: Gender

3. VITALS

- 19 patients were hypotensive on presentation
- 31 patients were having tachycardia
- 8 patients were tachpnoeic
- 40 patients were febrile

Table 3: Vitals

VITALS	No. of Cases	Percentage
HYPOTENSION	19	19.0%
TACHYCARDIA	31	31.0%
TACHYPONEA	8	8.0%
FEBRILE	40	40.0%

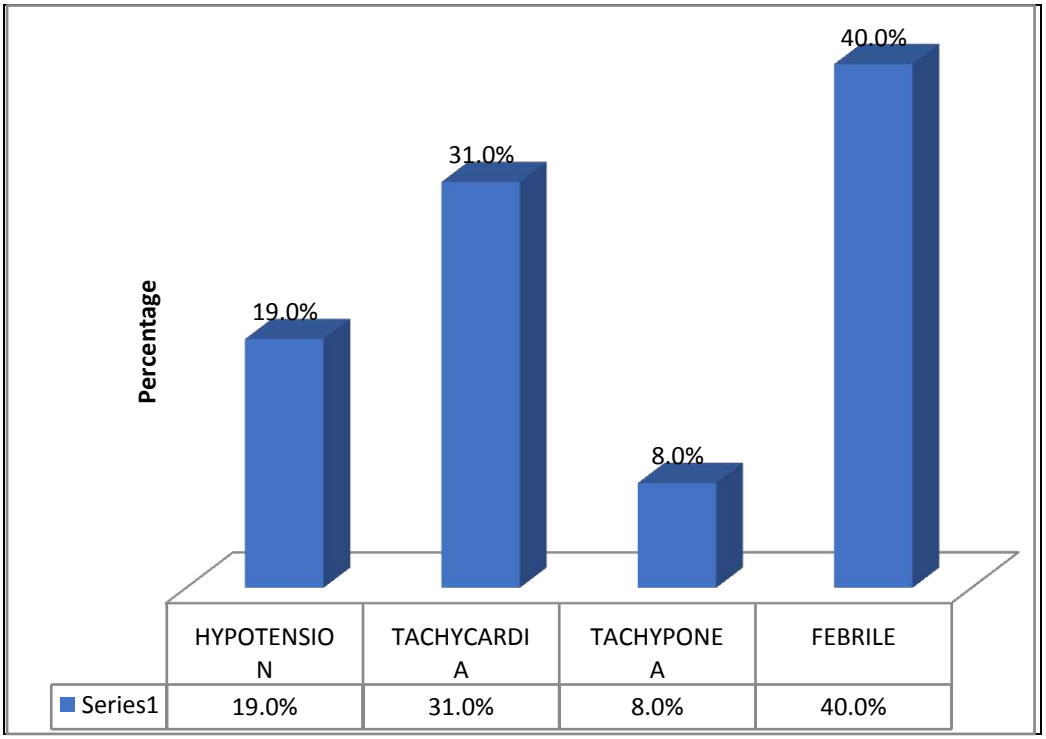


Figure 3: Vitals

4. DURATION OF COMPLAINTS

- 22 patients were having symptoms for <72 hrs
- 78 patients were having symptoms >72 hrs

Table 4: Duration of Complaints

DURATION OF COMPLAINTS	No. of Cases	Percentage
< 72 hrs	22	22.0%
> 72 hrs	78	78.0%
Total	100	100.0%

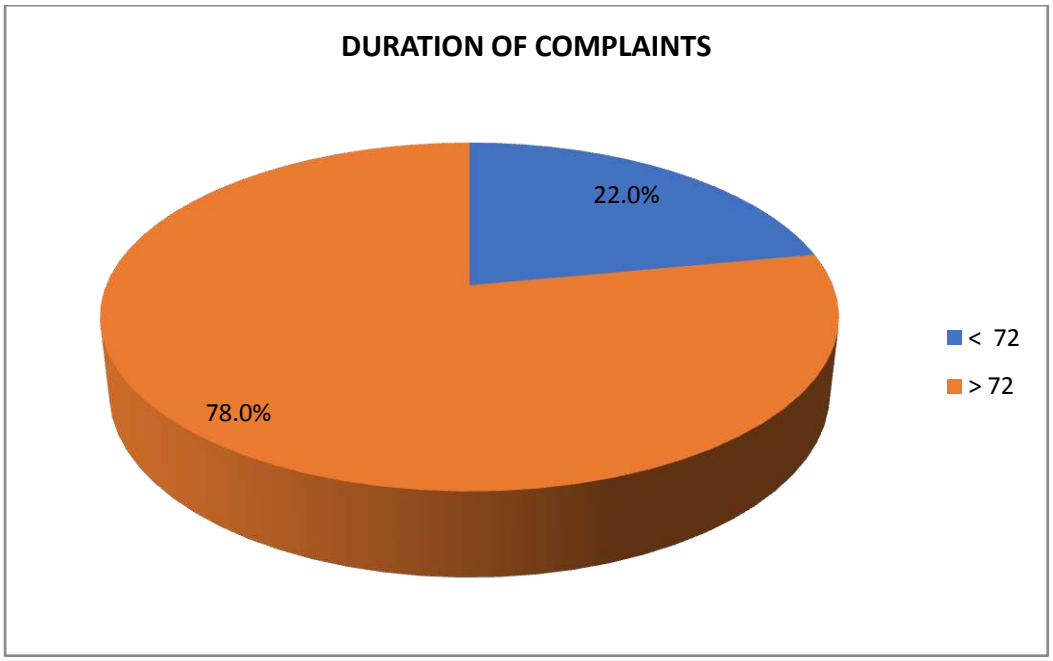


Figure 4: Duration of Complaints

5. PER ABDOMEN FINDINGS

- Murphy's sign seen in 51 patients.
- Palpable tender mass in 52 patients.

Table 5: Per abdomen findings

PER ABDOMEN	No. of Cases	Percentage
MURPHYS SIGN	51	51.0%
PALPABLE TENDER MASS	52	52.0%

Table 5a: Comparison of Per abdomen findings among grades of acute cholecystitis

		GRADE OF ACUTE CHOLECYSTITIS						Total	chi-square value	p-value
		Mild (n=12)		Moderate (n=55)		Severe (n=33)				
MURPHYS SIGN	N	1	8.3%	20	36.4%	28	84.8%	49	28.426	0.001
	Y	11	91.7%	35	63.6%	5	15.2%	51		
PALPABLE TENDER MASS	N	12	100.0%	31	56.4%	5	15.2%	48	28.807	0.001
	Y	0	0.0%	24	43.6%	28	84.8%	52		

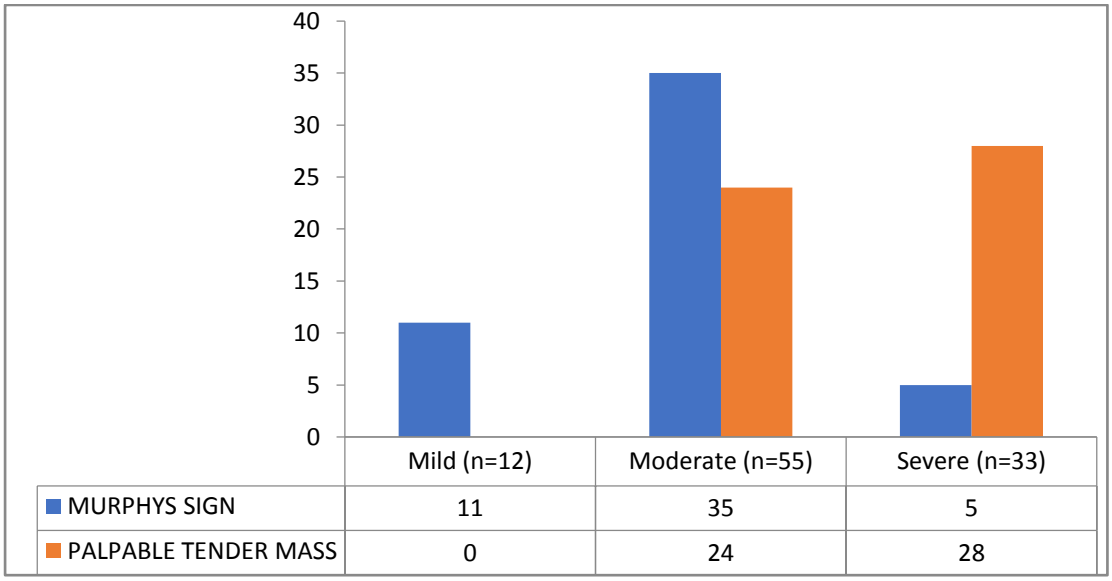


Figure 5: Comparison of Per abdomen findings among grades of acute cholecystitis

6. COMORBIDITIES

- 34 patients were diabetic
- Others: 36

Table 6: Comorbidities

COMORBIDITIES	No. of Cases	Percentage
DIABETES	34	34.0%
OTHERS	36	36.0%

Table 6a: Comparison of Comorbidities among grades of acute cholecystitis

		GRADE OF ACUTE CHOLECYSTITIS						Total	chi-square value	p-value
		Mild (n=12)		Moderate (n=55)		Severe (n=33)				
DIABETES	Y	3	25.0%	12	21.8%	19	57.6%	34	12.244	0.002
OTHERS	Y	1	8.3%	14	25.5%	21	63.6%	36	17.581	0.001

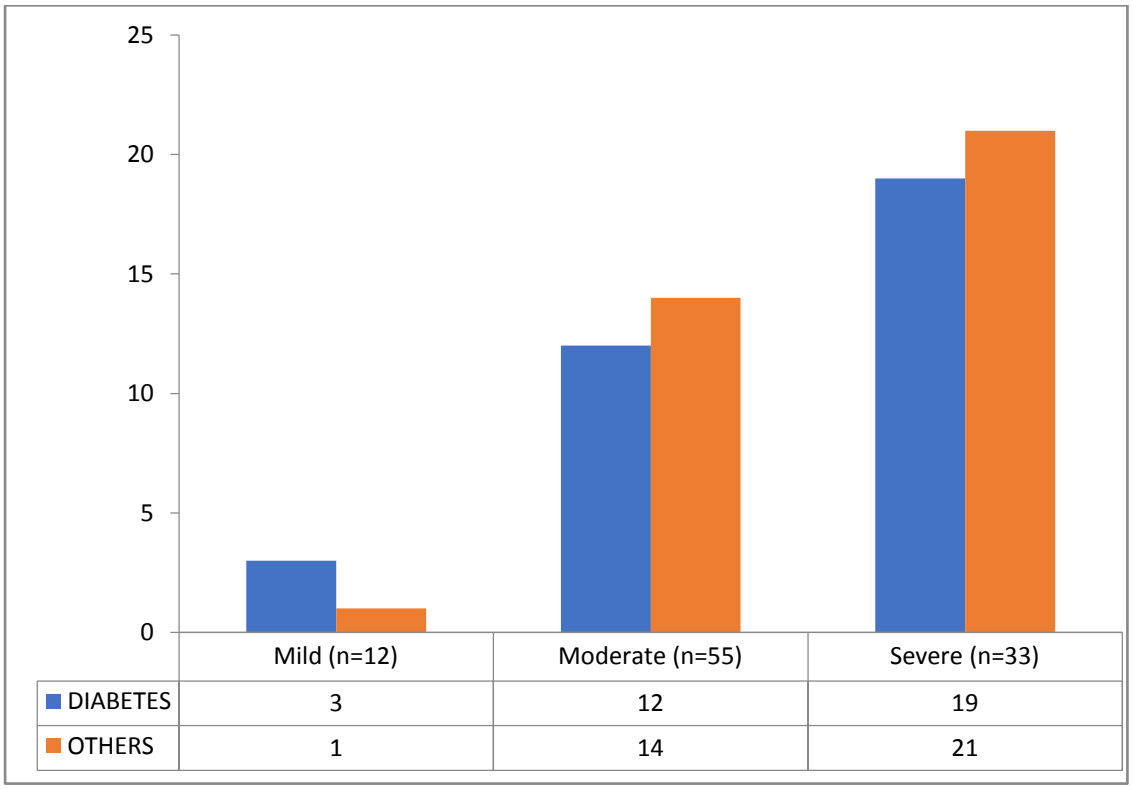


Figure 6: Comparison of Comorbidities among grades of acute cholecystitis

7. LABORATORY PROFILE

7a: Total Leucocyte Count (TLC)

- 55 patients had count more than 18000
- 45 patients had count less than 18000

Table 7a: TLC

TLC	No. of Cases	Percentage
< 18	55	55.0%
> 18	45	45.0%
Total	100	100.0%

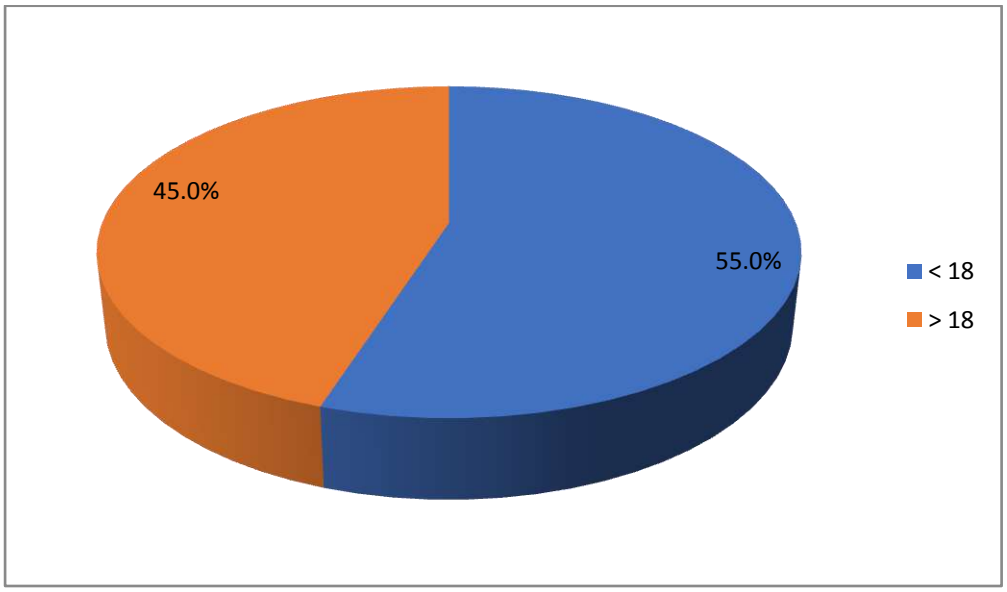


Figure 7a: TLC

7b: Total Bilirubin

- Normal levels in 83 patients.
- Increased levels seen in 17 patients.

Table 7b: Total Bilirubin

BILIRUBIN -T/D/I	No. of Cases	Percentage
Normal	83	83.0%
Raised	17	17.0%
Total	100	100.0%

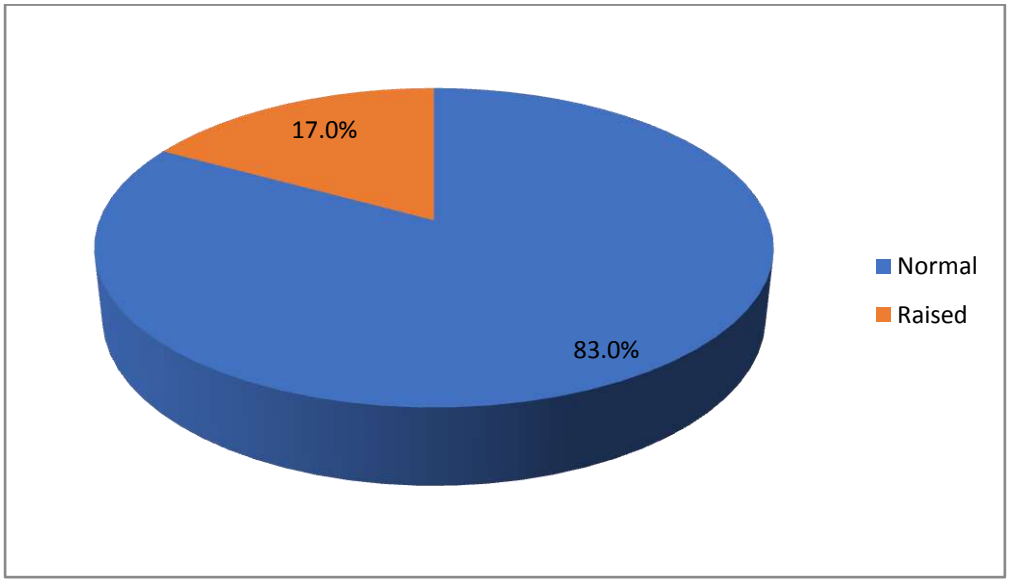


Figure 7b: Total Bilirubin

7c. Alkaline Phosphatase (ALP)

- Normal levels in 82 patients.
- Raised levels seen in 18 patients.

Table 7c: ALP

ALP	No. of Cases	Percentage
Normal	82	82.0%
Raised	18	18.0%
Total	100	100.0%

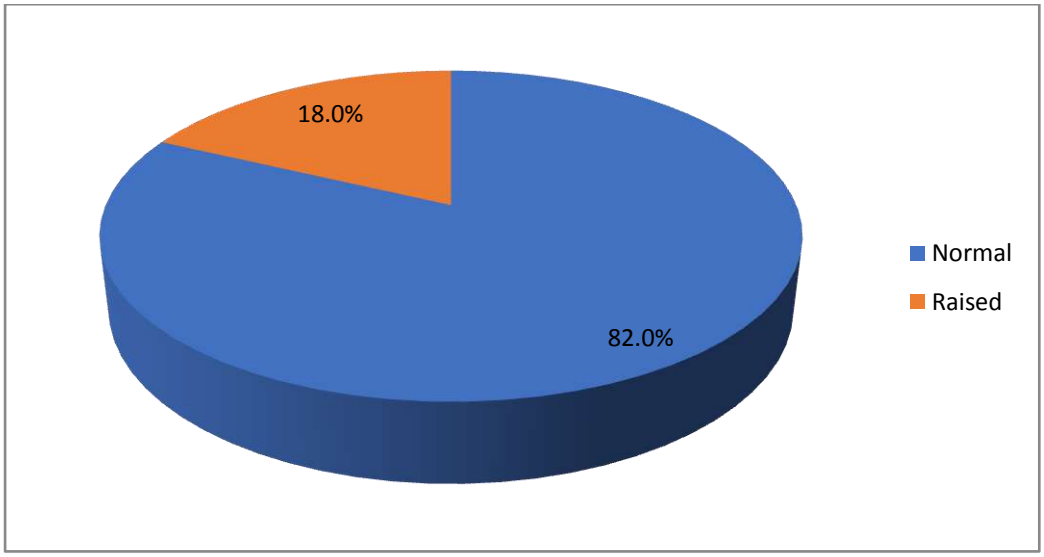


Figure 7c: ALP

7d. Platelet Count

- 90 patients had platelet count more than 1 lakhs
- 10 patients had count less than 1 lakhs

Table 7d: Platelet count

PLT COUNT	No. of Cases	Percentage
> 1 lakh	90	90.0%
< 1 lakh	10	10.0%
Total	100	100.0%

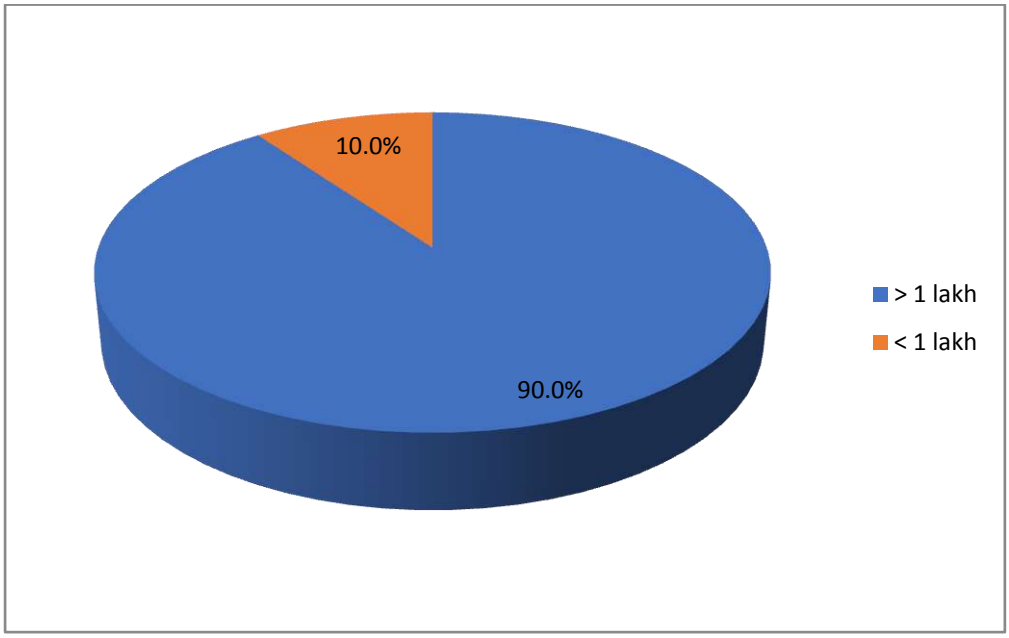


Figure 7d: Platelet count

7e. Serum amylase/lipase

- Normal in 88 patients
- Raised in 12 patients

Table 7e: Serum amylase/lipase

S. AMYLASE/LIPASE	No. of Cases	Percentage
Normal	88	88.0%
Raised	12	12.0%
Total	100	100.0%

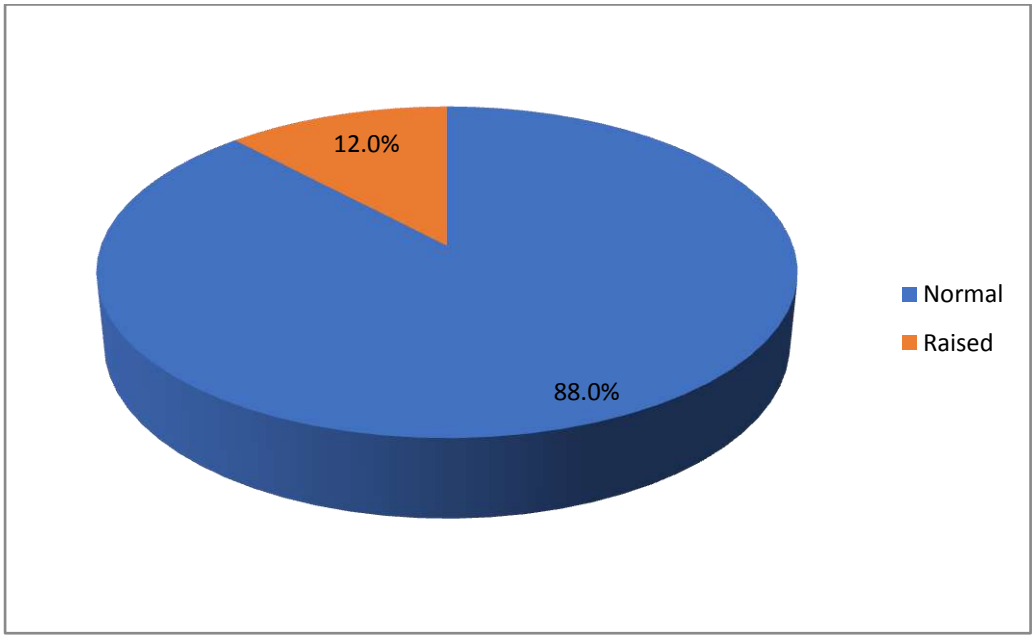


Figure 7e: Serum amylase/lipase

7f. PT/INR

- <1.5 in 88 patients
- >1.5 in 12 patients

Table 7f: PT/INR

PTI/INR	No. of Cases	Percentage
< 1.5	88	88.0%
> 1.5	12	12.0%
Total	100	100.0%

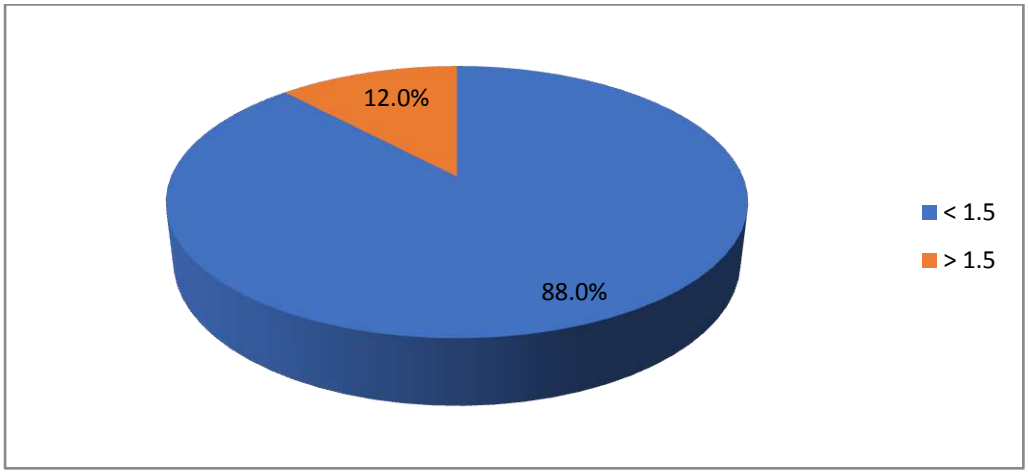


Figure 7f: PT/INR

7g: Serum creatinine:

- <2mg/dl was seen in 73 patients
- >2mg/dl was seen in 27 patients

Table 7g: Serum creatinine

S. CREATININE	No. of Cases	Percentage
< 2mg/dl	73	73.0%
> 2mg/dl	27	27.0%
Total	100	100.0%

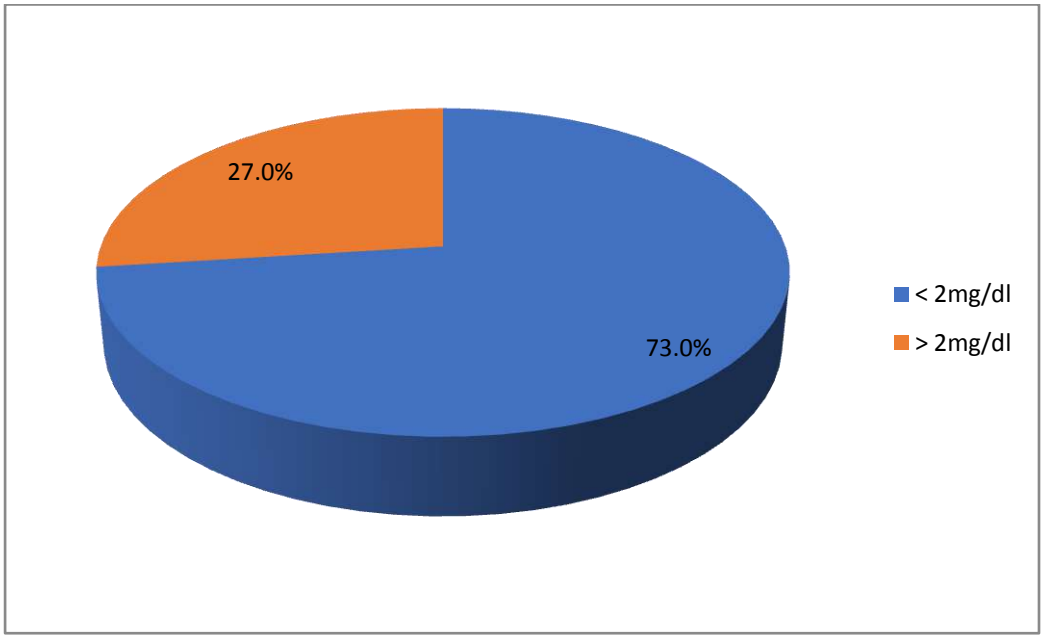


Figure 7g: Serum creatinine

8. IMAGING FINDINGS

- Inflammatory changes: 66
- Gall stones: 99
- Acalculous cholecystitis: 1
- Gangrenous cholecystitis: 8
- Pericholecystic abscess: 16
- Hepatic abscess: 6
- Biliary peritonitis: 12
- Emphysematous cholecystitis: 7
- Mild pancreatitis: 18
- Acute on chronic cholecystitis: 10

Table 8: Imaging findings

IMAGING FINDINGS	No. of Cases	Percentage
INFLAMMATORY CHANGES (GB WALL THICKENED / OVERDISTENDED GB)	66	66.0%
GALL STONES/DEBRIS	99	99.0%
ACALCULOUS CHOLECYSTITIS	1	1.0%
GANGRENOUS CHOLECYSTITIS	8	8.0%
PERICHOLECYSTIC ABSCESS	16	16.0%
HEPATIC ABSCESS	6	6.0%
BILIARY PERITONITIS	12	12.0%
EMPHYSEMATOUS CHOLECYSTITIS	7	7.0%
MILD PANCREATITIS	18	18.0%
ACUTE ON CHRONIC CHOLECYSTITIS	10	10.0%

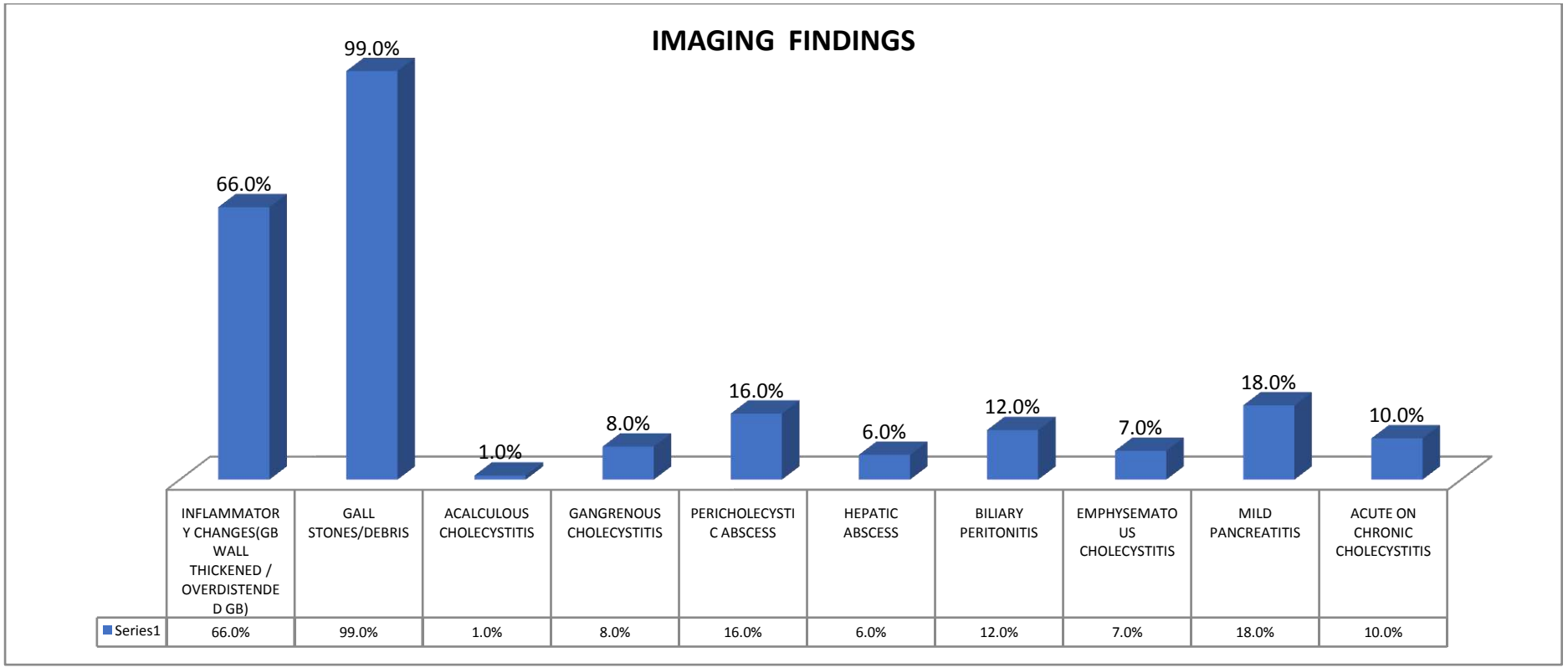


Figure 8: Imaging findings

9. **Grades of acute cholecystitis:**

- Mild (grade 1): 12 patients
- Moderate (grade 2): 55 patients
- Severe (grade 3): 33 patients

Table 9: Grades of acute cholecystitis

GRADE OF ACUTE CHOLECYSTITIS	No. of Cases	Percentage
1	12	12.0%
2	55	55.0%
3	33	33.0%
Total	100	100.0%

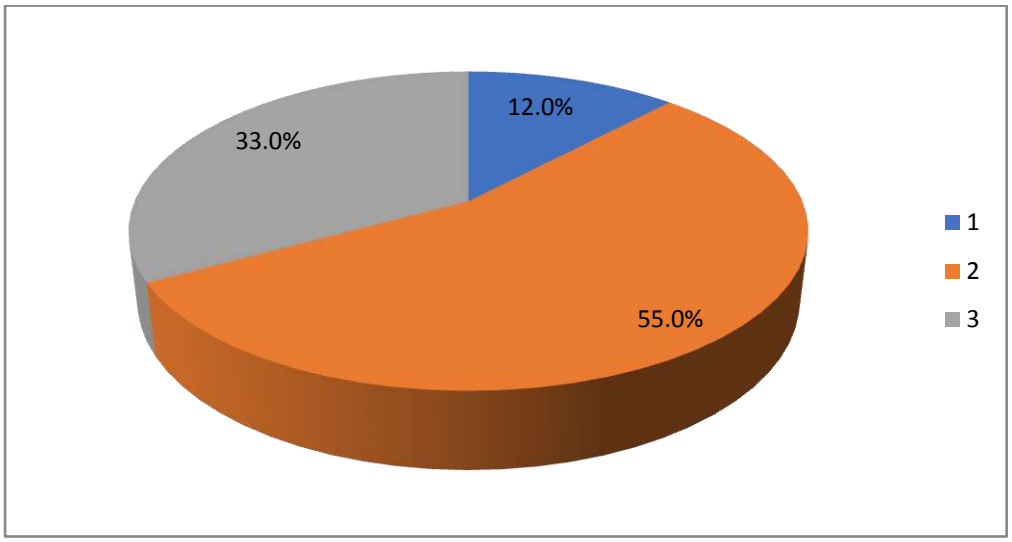


Figure 9: Grades of acute cholecystitis

10. PROCEDURE

- Lap cholecystectomy: 62
- Lap converted to open cholecystectomy: 3
- Percutaneous drainage(cholecystostomy): 4
- PCD f/b interval cholecystectomy: 23
- PCD f/b same admission cholecystectomy: 8
- Total number of PCD Cases: 35

Table 10: Procedure

PROCEDURE	No. of Cases	Percentage
LAP CHOLE	62	62.0%
LAP CONV TO OPEN	3	3.0%

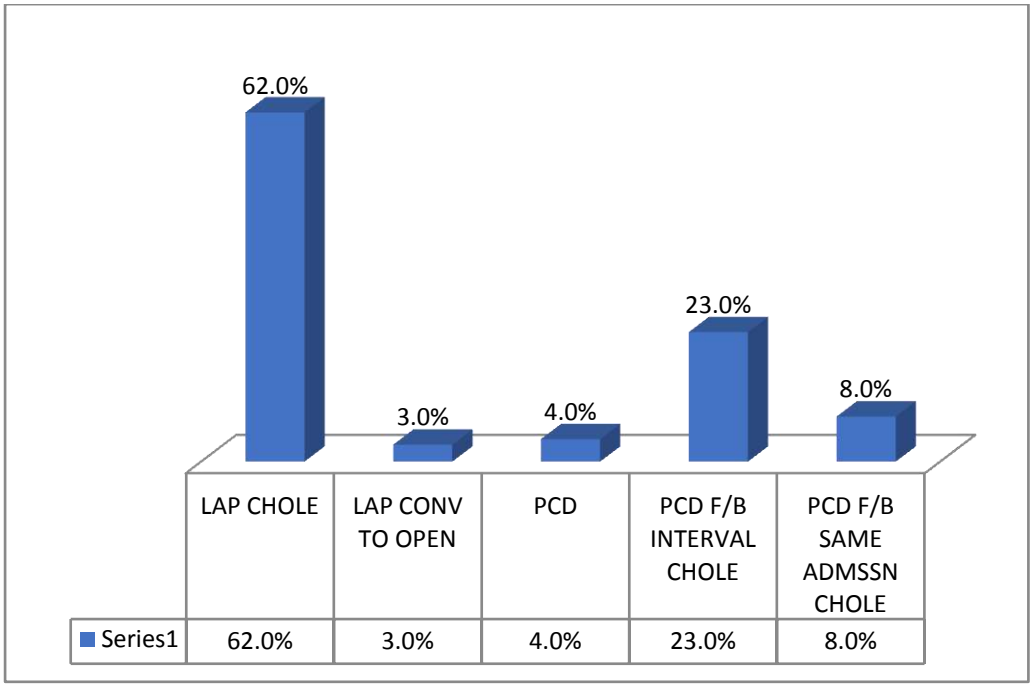


Figure 10: Procedure

Table 10A: Total number of PCD Cases

PROCEDURE	No. of Cases	Percentage
PCD	4	11.4%
PCD F/B INTERVAL CHOLE	23	65.7%
PCD F/B SAME ADMSSN CHOLE	8	22.9%
Total Number of PCD Cases	35	100.0%

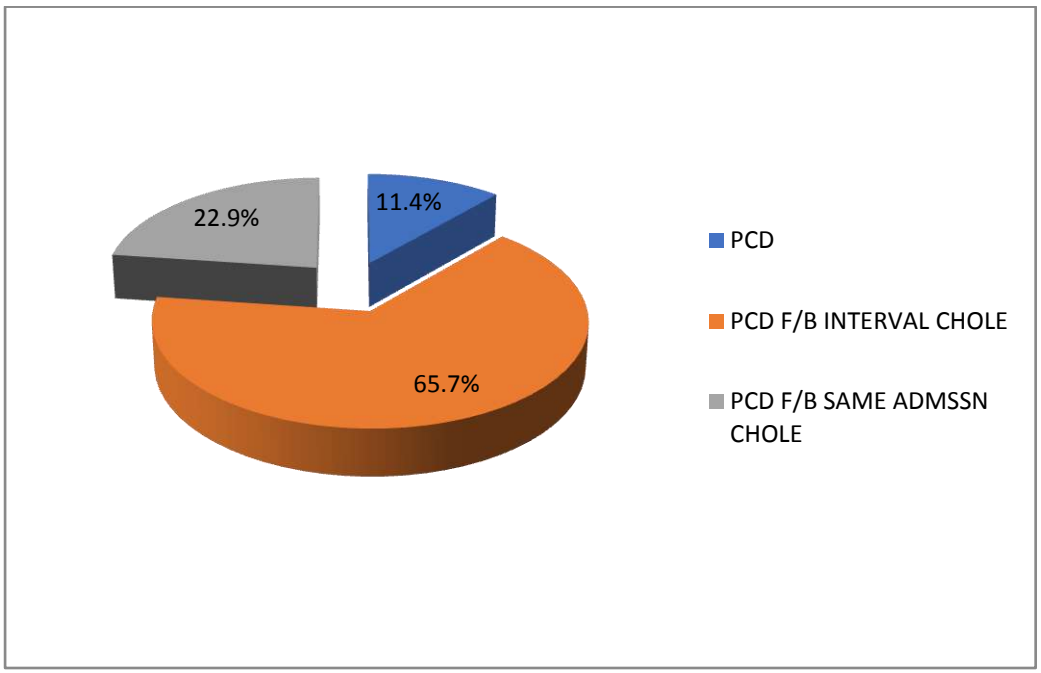


Figure 10A: Total number of PCD Cases

11. HOSPITAL/ICU STAY

- 1-2 days: 43 patients
- 3-7 days: 16 patients
- 3-7 days with ICU: 22 patients
- >7 days with ICU: 19 patients

Table 11: Hospital/ICU stay

HOSPITAL /ICU STAY	No. of Cases	Percentage
1-2 DAYS	43	43.0%
3-7 DAYS	16	16.0%
3-7 DAYS	22	22.0%
>7 DAYS	19	19.0%
Total	100	100.0%

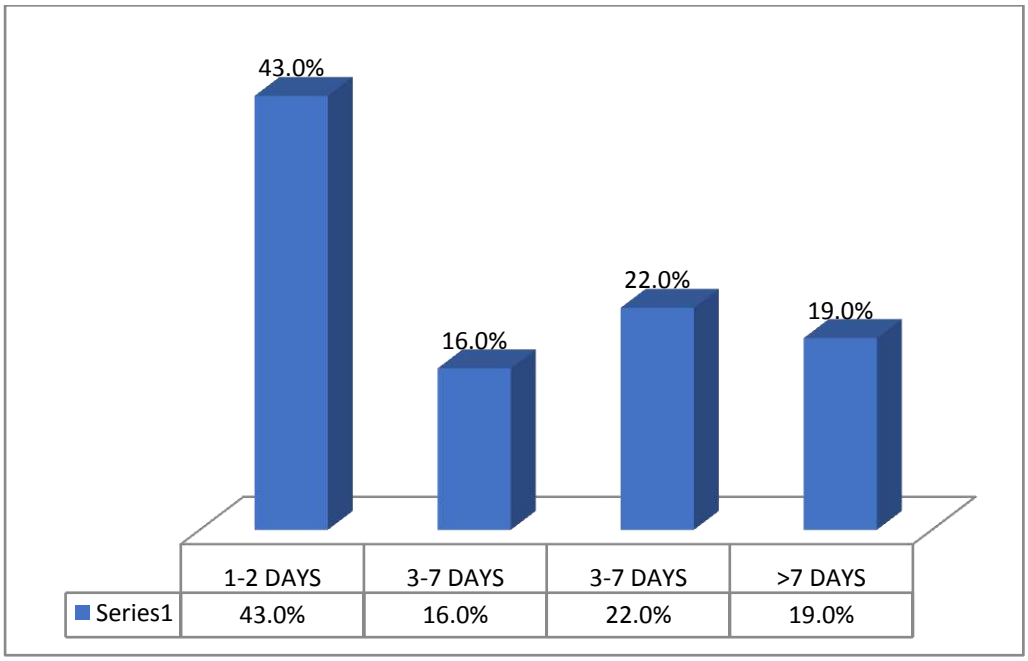


Figure 11: Hospital/ICU stay

12. COMPLICATIONS

Table 12: Complications

Complications	No. of Cases	Percentage
INTRAOP -BLEED FROM ADJ TISSUES	13	13.0%
BLD FROM CYSTIC ARTERY	8	8.0%
CBD INJURY	3	3.0%
IATROGENIC GB PERF	10	10.0%
BLD FROM PORT SITES	0	0.0%
GALL STONES SPILLAGE	5	5.0%
BOWEL INJURY	0	0.0%
POST OP BLEED ABDO WALL	0	0.0%
BILE LEAK	6	6.0%
SUBHEP COLLECTION	8	8.0%
HEMATOMA ABDO WALL	0	0.0%
PULM COMPLICATIONS	3	3.0%
LOST GALL STONE ABSCESS	0	0.0%
SSI	1	1.0%
MORTALITY	1	1.0%

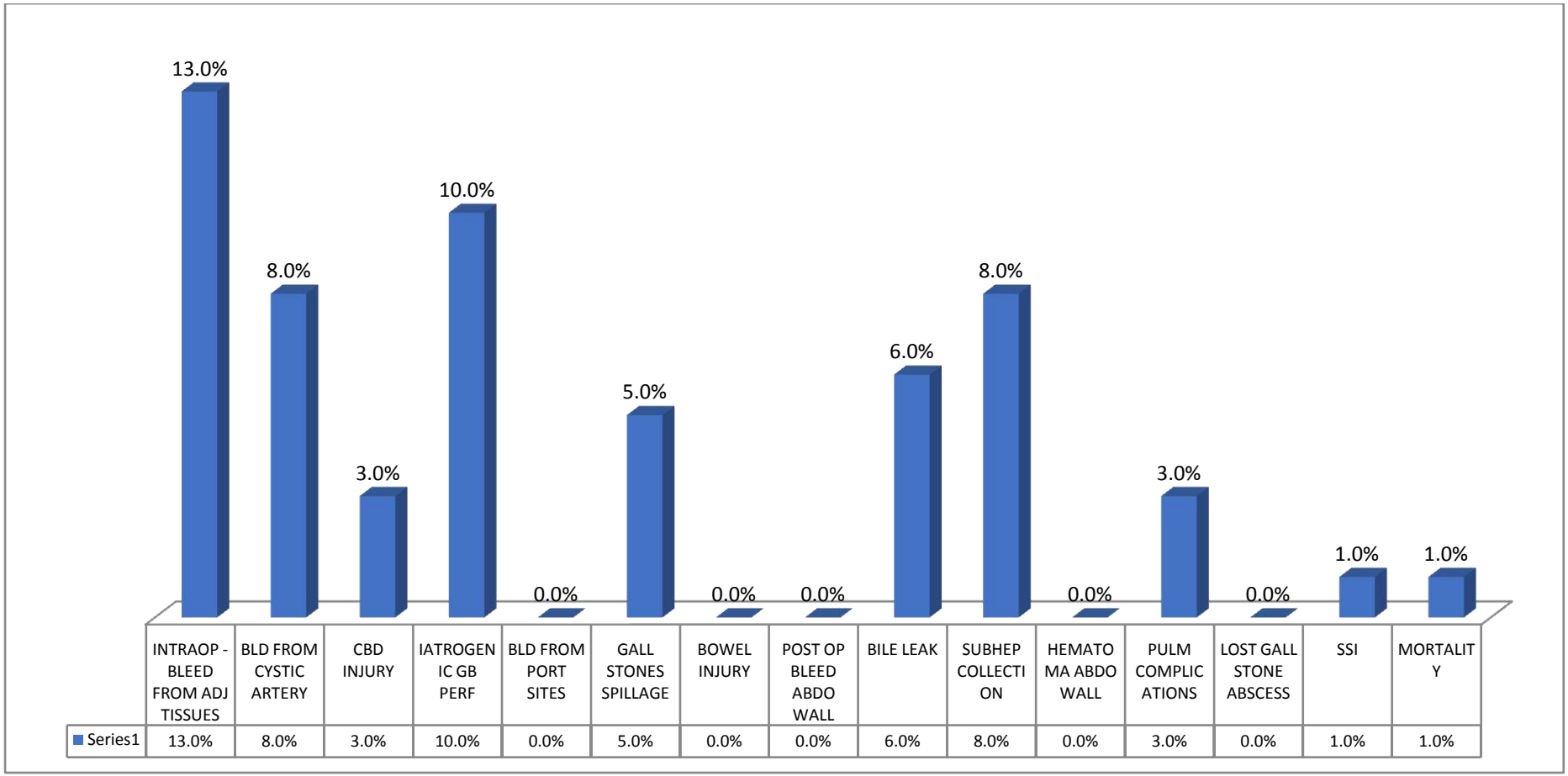


Figure 12: Complications

13. Relation of Age Group with Grade of Acute Cholecystitis

- More the age more is the severity and p value come out to be significant (0.001)

Table 13: Relation of Age Group with Grade of Acute Cholecystitis

		GRADE OF ACUTE CHOLECYSTITIS						Total	chi-square value	p-value
		Mild (n=12)		Moderate (n=55)		Severe (n=33)				
Age group	< 40	5	41.7%	13	23.6%	3	9.1%	21	22.406	0.001
	41-60	6	50.0%	29	52.7%	8	24.2%	43		
	> 60	1	8.3%	133	241.8%	22	66.7%	36		

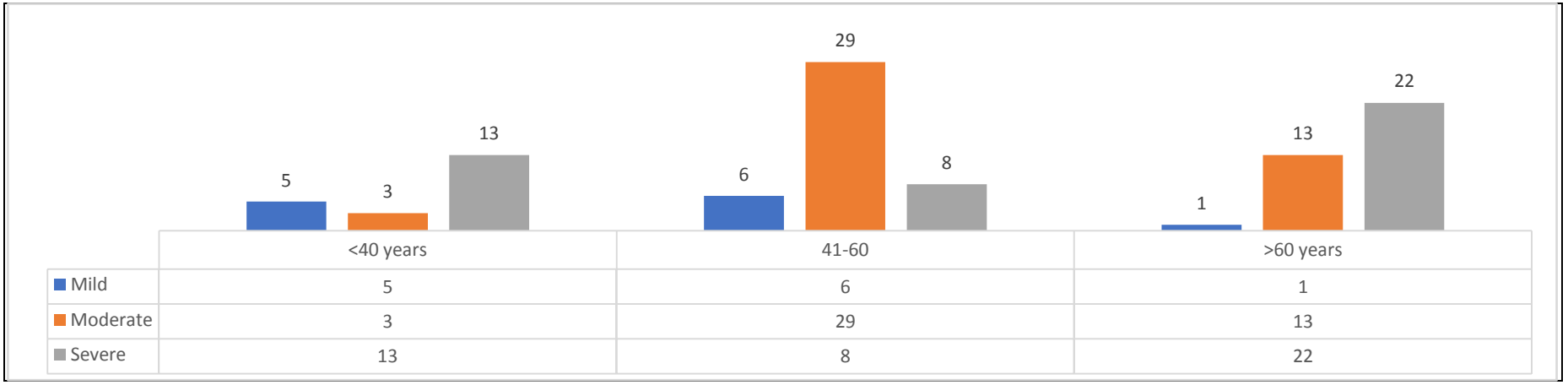


Figure 13: Relation of Age Group with Grade of Acute Cholecystitis

14. Relation of Gender with Grade of Acute Cholecystitis

- Non-significant correlation between gender and severity of cholecystitis

Table 14: Relation of Age Group with Grade of Acute Cholecystitis

		GRADE OF ACUTE CHOLECYSTITIS						Total	chi-square value	p-value
		Mild (n=12)		Moderate (n=55)		Severe (n=33)				
SEX	F	6	50.0%	26	47.3%	11	33.3%	43	1.908	0.385
	M	6	50.0%	29	52.7%	22	66.7%	57		

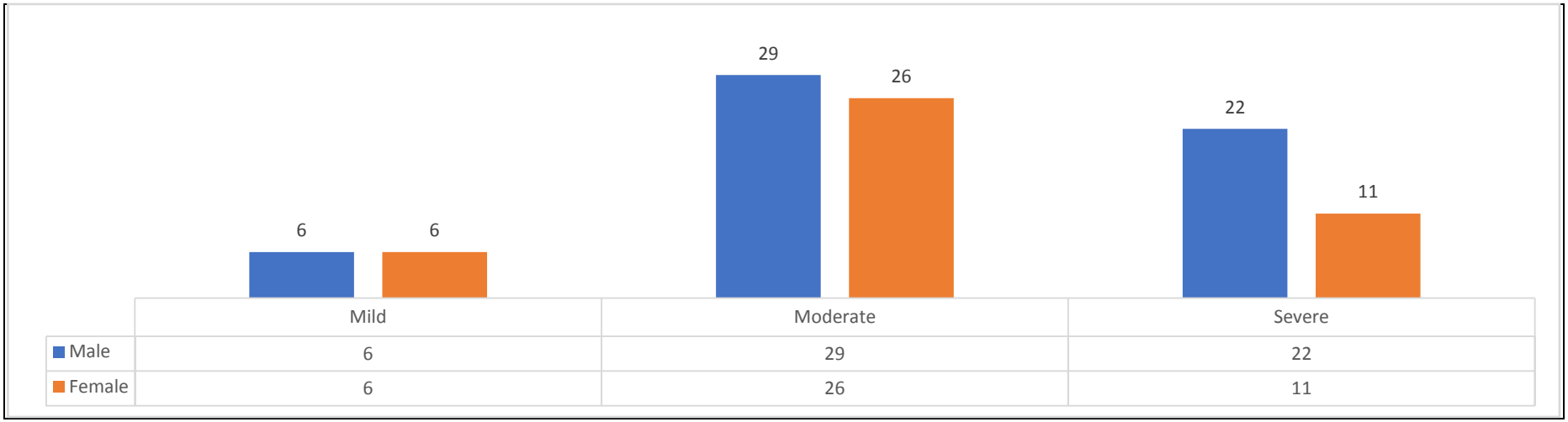


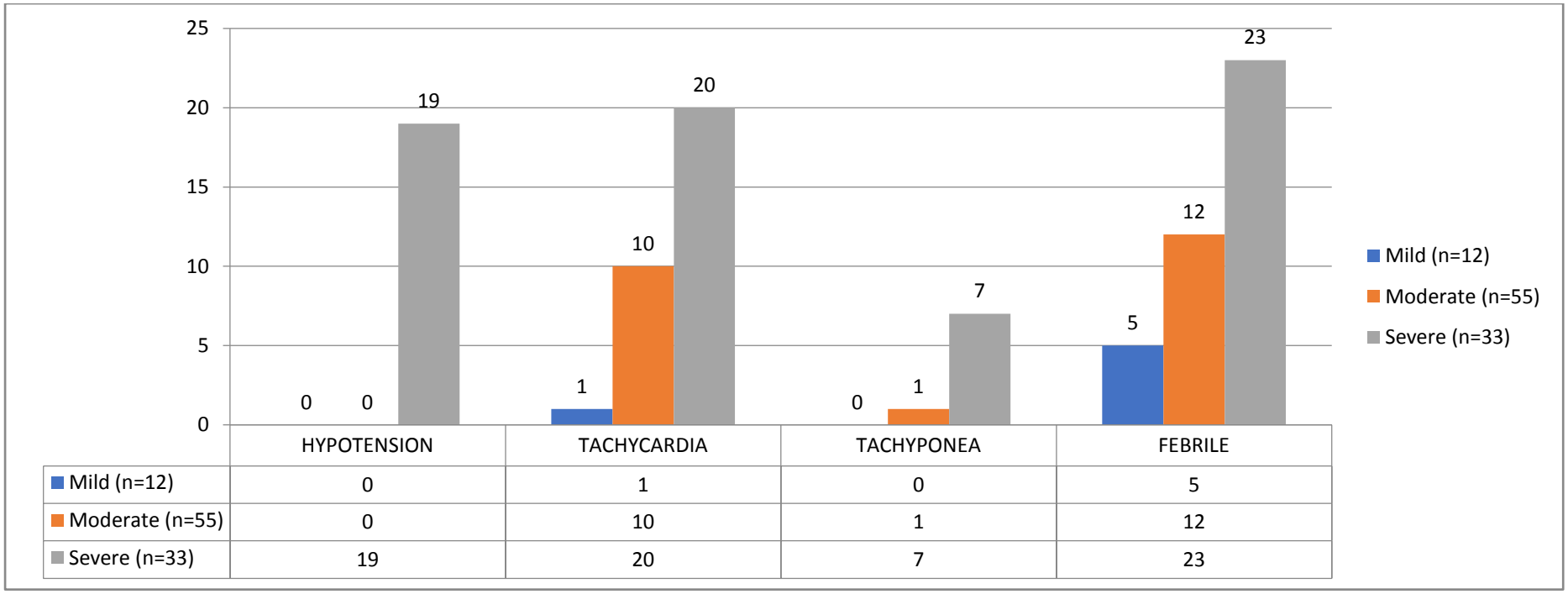
Figure 14: Relation of Age Group with Grade of Acute Cholecystitis

15. Relation of Vitals with Grade of Acute Cholecystitis

- More is the severity more deranged are the vitals and p value come out to be significant. (0.001)

Table 15: Relation of Vitals with Grade of Acute Cholecystitis

		GRADE OF ACUTE CHOLECYSTITIS						Total	chi-square value	p-value
		Mild (n=12)		Moderate (n=55)		Severe (n=33)				
HYPOTENSION	N	12	100.0%	53	96.4%	16	48.5%	81	33.920	0.001
	Y	0	0.0%	0	0.0%	19	57.6%	19		
TACHYCARDIA	N	11	91.7%	45	81.8%	13	39.4%	69	20.630	0.001
	Y	1	8.3%	10	18.2%	20	60.6%	31		
TACHYPONEA	N	12	100.0%	54	98.2%	26	78.8%	92	11.726	0.003
	Y	0	0.0%	1	1.8%	7	21.2%	8		
FEBRILE	N	7	58.3%	43	78.2%	10	30.3%	60	19.716	0.001
	Y	5	41.7%	12	21.8%	23	69.7%	40		



	HYPOTENSION	TACHYCARDIA	TACHYPONEA	FEBRILE
Mild (n=12)	0	1	0	5
Moderate (n=55)	0	10	1	12
Severe (n=33)	19	20	7	23

Figure 15: Relation of Vitals with Grade of Acute Cholecystitis

16. Relation of Duration of Complaints with Grade of Acute Cholecystitis

- Longer is the duration of symptoms more is the severity of cholecystitis and p value come out to be significant (0.001)

Table 16: Relation of Duration of Complaints with Grade of Acute Cholecystitis

		GRADE OF ACUTE CHOLECYSTITIS						Total	chi-square value	p-value
		Mild (n=12)		Moderate (n=55)		Severe (n=33)				
DURATION OF COMPLAINTS	<72hrs	12	100.0%	3	5.5%	7	21.2%	22	51.331	0.001
	>72hrs	0	0.0%	52	94.5%	26	78.8%	78		

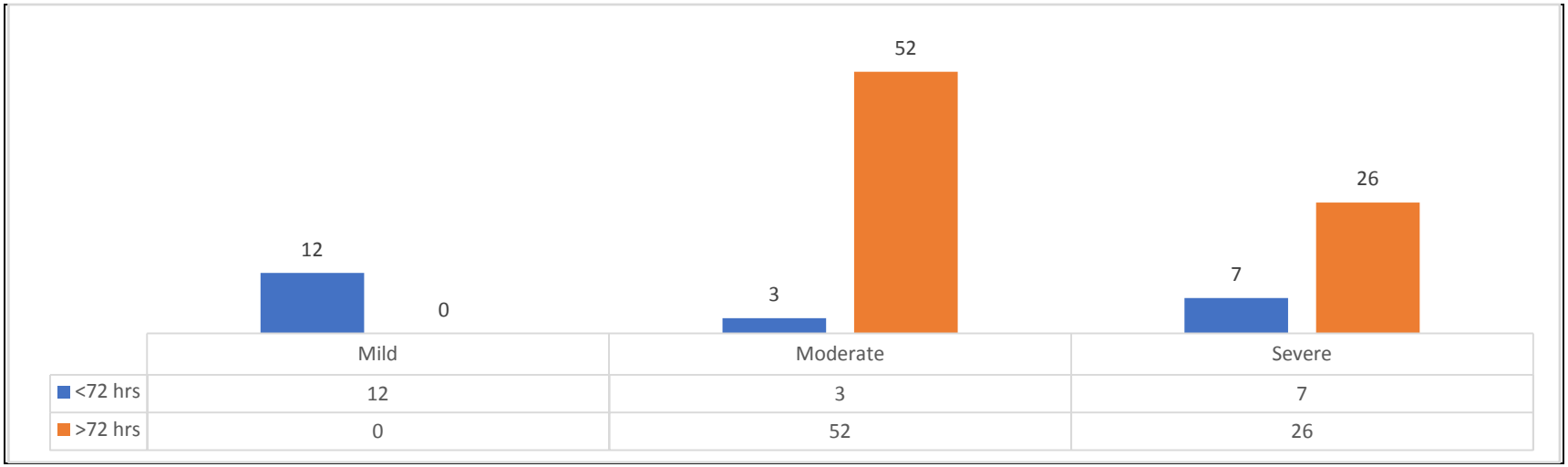


Figure 16: Relation of Duration of Complaints with Grade of Acute Cholecystitis

17. Relation of Procedure with Grade of Acute Cholecystitis

- More is the severity more conservative is the approach and p value for it come out to be significant (0.0001)

Table 17: Relation of Procedure with Grade of Acute Cholecystitis

		GRADE OF ACUTE CHOLECYSTITIS						Total	chi-square value	p-value
		Mild (n=12)		Moderate (n=55)		Severe (n=33)				
PROCEDURE	Lap Cholecystectomy	12	100.0%	47	85.5%	3	9.1%	62	75.888	0.0001
	Lap conv to Open Cholecystectomy	0	0.0%	3	5.5%	0	0.0%	3		
	PCD	0	0.0%	0	0.0%	4	12.1%	4		
	Pcd f/b Interval Cholecystectomy	0	0.0%	5	9.1%	18	54.5%	23		
	PCD f/b Same admission Cholecystectomy	0	0.0%	0	0.0%	8	24.2%	8		

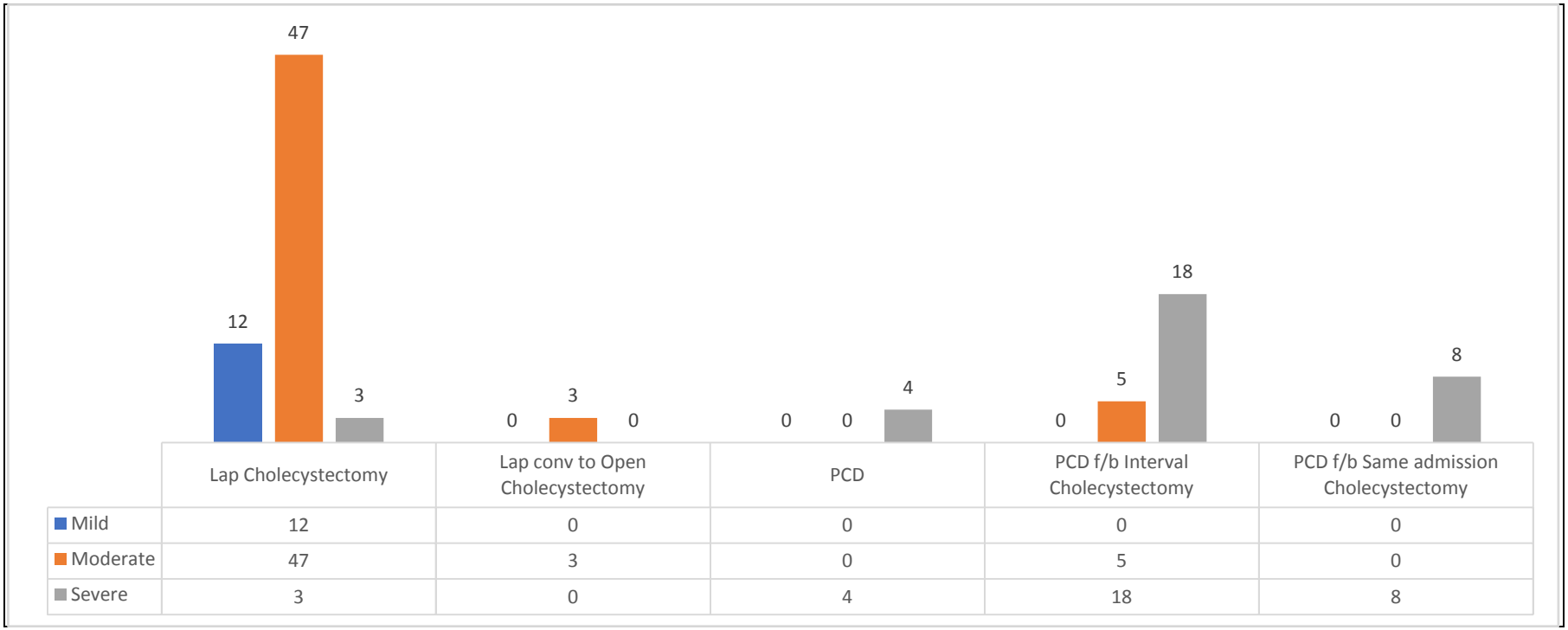


Figure 17: Relation of Procedure with Grade of Acute Cholecystitis

18. Relation of Hospital Stay with Grade of Acute Cholecystitis

- More is the severity more is duration of hospital stay and p value come out to be significant (0.0001)

Table 18: Relation of Hospital Stay with Grade of Acute Cholecystitis

		GRADE OF ACUTE CHOLECYSTITIS						Total	chi-square value	p-value
		Mild (n=12)		Moderate (n=55)		Severe (n=33)				
HOSP STAY	1-2 days	11	91.7%	32	58.2%	0	0.0%	43	68.973	0.0001
	3-7 days	1	8.3%	13	23.6%	2	6.1%	16		
	3-7 days+ ICU	0	0.0%	9	16.4%	13	39.4%	22		
	>7 Days	0	0.0%	1	1.8%	18	54.5%	19		

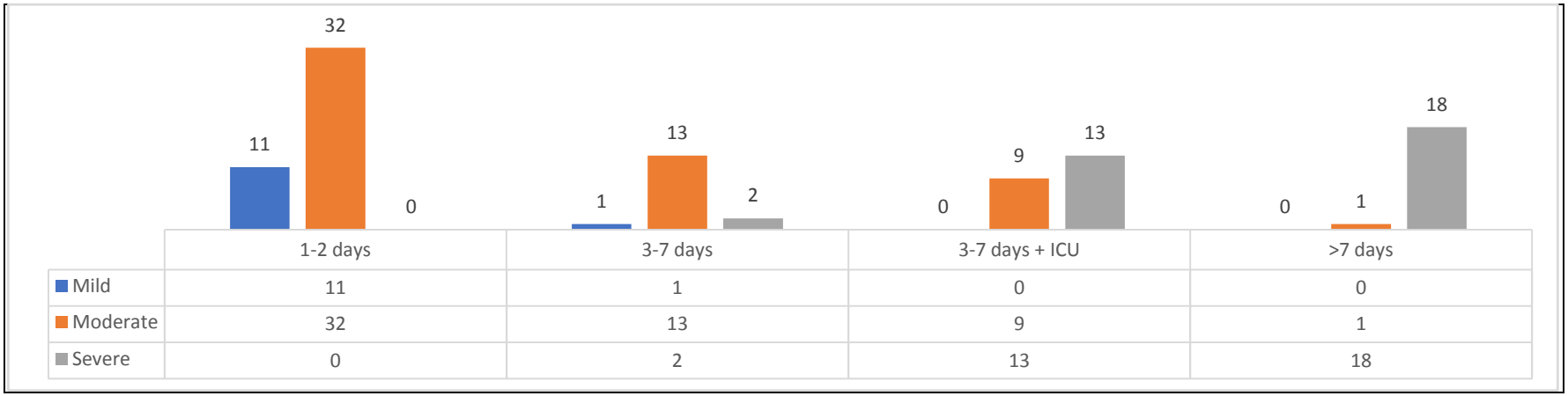


Figure 18: Relation of Hospital Stay with Grade of Acute Cholecystitis

19. Relation of Medical Cost with Grade of Acute Cholecystitis

- More is the severity more is the duration of hospital stay more is the medical cost and p value is significant (0.0001)

Table 19: Relation of Medical Cost with Grade of Acute Cholecystitis

		GRADE OF ACUTE CHOLECYSTITIS						Total	chi-square value	p-value
		Mild (n=12)		Moderate (n=55)		Severe (n=33)				
MEDICAL COST	< 50,000	12	100.0%	47	85.5%	2	6.1%	61	63.915	0.0001
	> 50,000-1 lac	0	0.0%	8	14.5%	14	42.4%	22		
	>1 lac	0	0.0%	0	0.0%	13	39.4%	13		

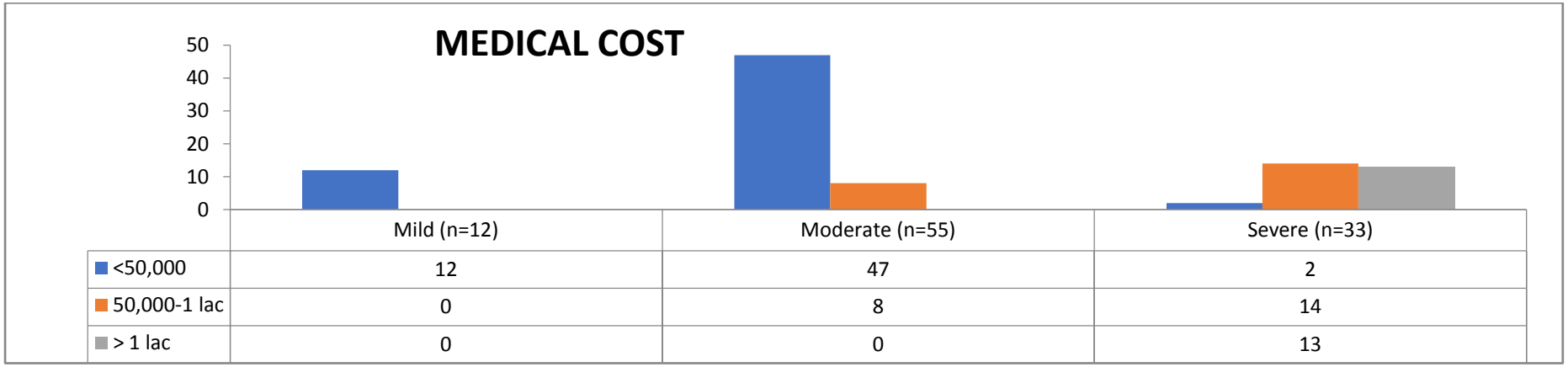


Figure 19: Relation of Medical Cost with Grade of Acute Cholecystitis

20. Relation of Complications with Grade of Acute Cholecystitis

- More is the severity more are the intraoperative complications with significant p-value (0.043)

Table 20: Relation of Complications with Grade of Acute Cholecystitis

		GRADE OF ACUTE CHOLECYSTITIS						Total	chi-square value	p-value
		Mild (n=12)		Moderate (n=55)		Severe (n=33)				
INTRA OP COMPLI	N	11	91.7%	46	83.6%	21	63.6%	78	6.292	0.043
	Y	1	8.3%	9	16.4%	12	36.4%	22		
POST OP COMPLI	N	11	91.7%	49	89.1%	28	84.8%	88	0.525	0.769
	Y	1	8.3%	6	10.9%	5	15.2%	12		

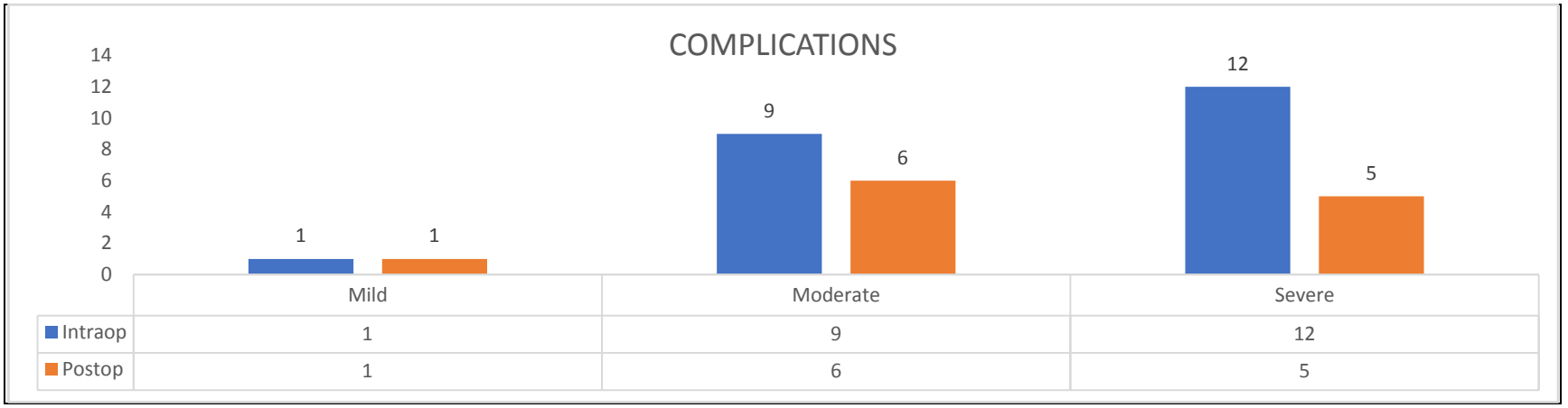


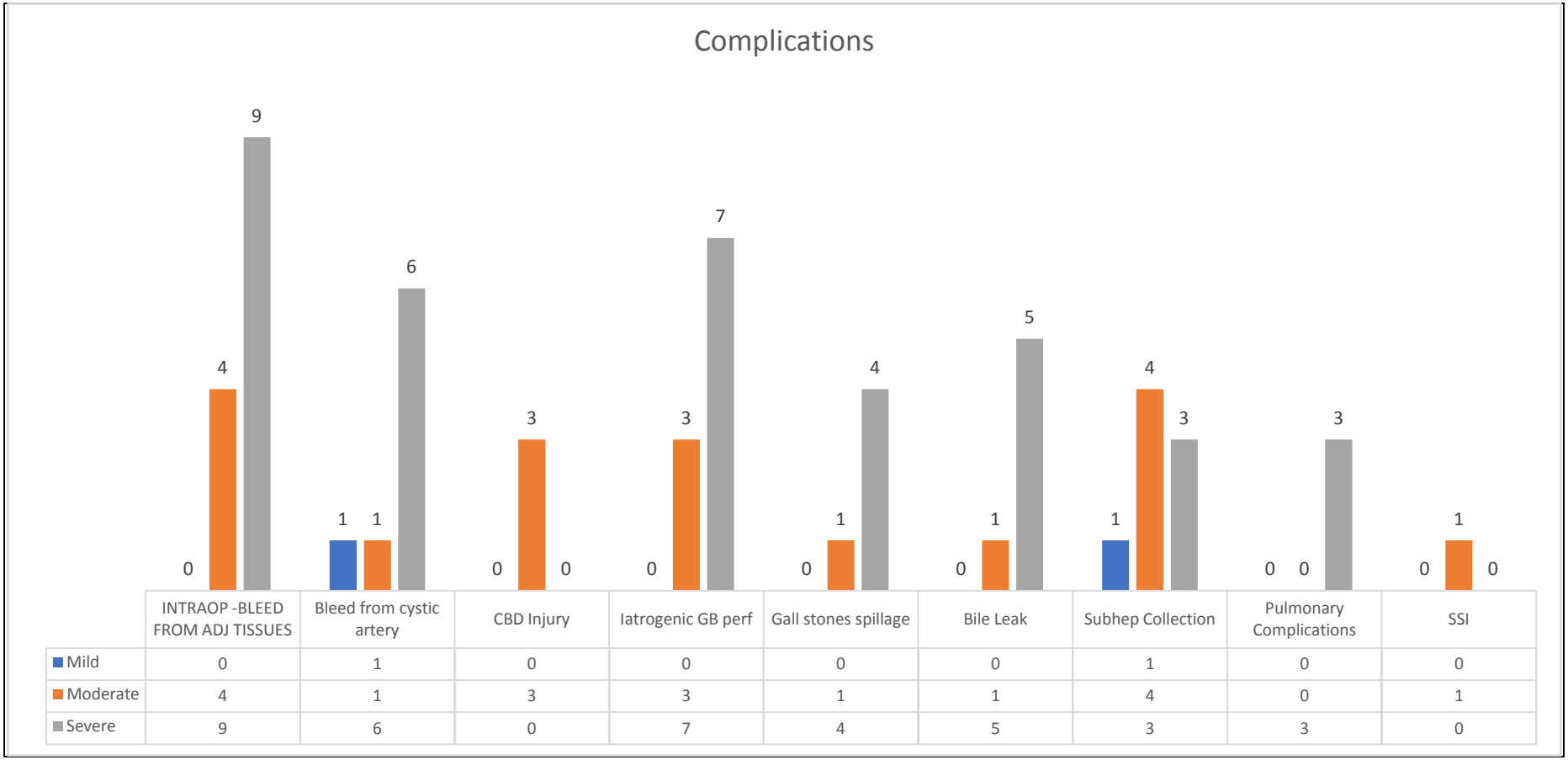
Figure 20: Relation of Complications with Grade of Acute Cholecystitis

Table 20a: Relation of Specific Complications with Grade of Acute Cholecystitis

- Intra-operative bleeding from adjacent tissues was found significantly in severe grade (p value=0.009)
- Bleeding from cystic artery was found significantly in severe grade (p value=0.023)
- Bile leak was found significant post- operative complication in severe grade (p value=0.025)

		GRADE OF ACUTE CHOLECYSTITIS						Total	chi-square value	p-value
		Mild (n=12)		Moderate (n=55)		Severe (n=33)				
INTRAOP -BLEED FROM ADJ TISSUES	N	12	100.0%	51	92.7%	24	72.7%	87	9.332	0.009
	Y	0	0.0%	4	7.3%	9	27.3%	13		
BLD FROM CYSTIC ARTERY	N	11	91.7%	54	98.2%	27	81.8%	92	7.506	0.023
	Y	1	8.3%	1	1.8%	6	18.2%	8		
CBD INJURY	N	12	100.0%	52	94.5%	33	100.0%	97	2.53	0.282
	Y	0	0.0%	3	5.5%	0	0.0%	3		
IATROGENIC GB PERF	N	12	100.0%	52	94.5%	26	78.8%	90	7.205	0.027
	Y	0	0.0%	3	5.5%	7	21.2%	10		
GALL STONES SPILLAGE	N	12	100.0%	54	98.2%	29	87.9%	95	5.327	0.070
	Y	0	0.0%	1	1.8%	4	12.1%	5		

BILE LEAK	N	12	100.0%	54	98.2%	28	84.8%	94	7.372	0.025
	Y	0	0.0%	1	1.8%	5	15.2%	6		
SUBHEP COLLECTION	N	11	91.7%	51	92.7%	30	90.9%	92	0.095	0.954
	Y	1	8.3%	4	7.3%	3	9.1%	8		
PULM COMPLICATIONS	N	12	100.0%	55	100.0%	30	90.9%	97	6.279	0.043
	Y	0	0.0%	0	0.0%	3	9.1%	3		
SSI	N	12	100.0%	54	98.2%	33	100.0%	99	0.826	0.662
	Y	0	0.0%	1	1.8%	0	0.0%	1		
MORTALITY	N	12	100.0%	55	100.0%	32	97.0%	99	2.051	0.359
	Y	0	0.0%	0	0.0%	1	3.0%	1		



	INTRAOP -BLEED FROM ADJ TISSUES	Bleed from cystic artery	CBD Injury	Iatrogenic GB perf	Gall stones spillage	Bile Leak	Subhep Collection	Pulmonary Complications	SSI
Mild	0	1	0	0	0	0	1	0	0
Moderate	4	1	3	3	1	1	4	0	1
Severe	9	6	0	7	4	5	3	3	0

Figure 20a: Relation of Specific Complications with Grade of Acute Cholecystitis

Table 20b: Relation of Complications with Grade 2 and 3 of Acute Cholecystitis

- 5a= interval (delayed) cholecystectomy in grade 2 (n=5) and grade 3 (n=18) , 65.2% patients were having hospital stay >7 days and 34.8% were having ICU stay , 65.2% having medical cost between 50,000 - 1 lakh
- 5b=same admission(early) cholecystectomy in grade 3 (n=8) , 62.5% were having ICU stay, 62.5% having medical cost >1 lakh

		5a		5b	
HOSPITAL / ICU STAY	1-2 days	0	0.0%	0	0.0%
	3-7 days	0	0.0%	0	0.0%
	>7 days	15	65.2%	3	37.5%
	ICU stay	8	34.8%	5	62.5%
MEDICAL COST	< 50,000	0	0.0%	0	0.0%
	>50,000- 1 lac	15	65.2%	3	37.5%
	>1 lac	8	34.8%	5	62.5%

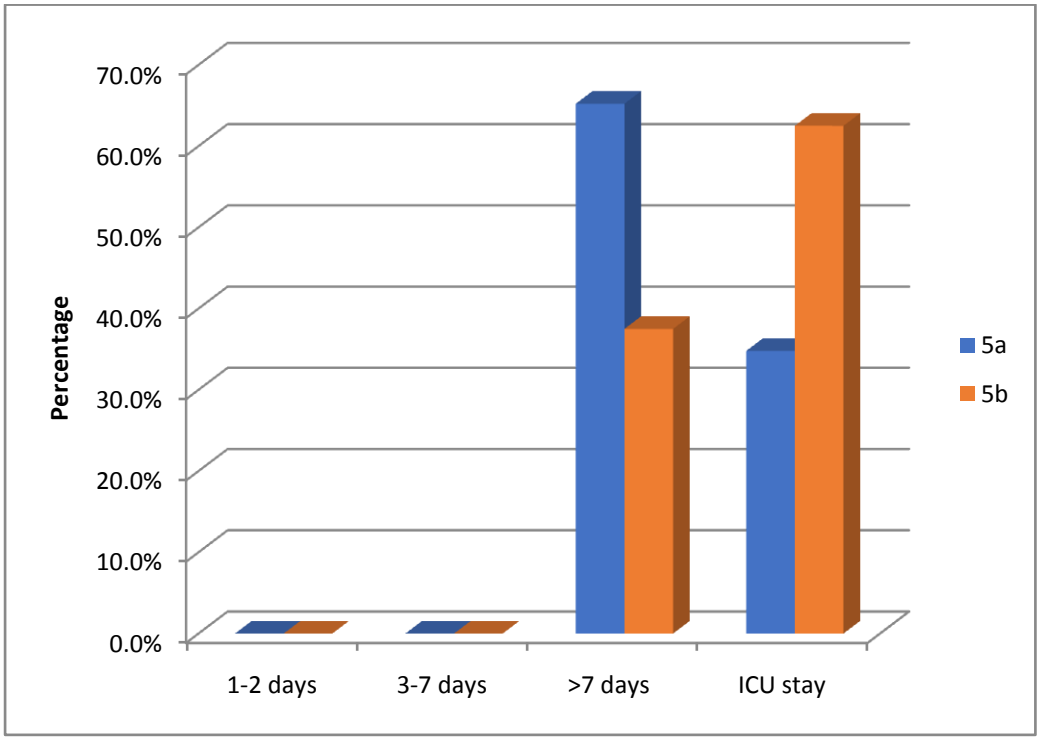


Figure 20(b1): Hospital Stay

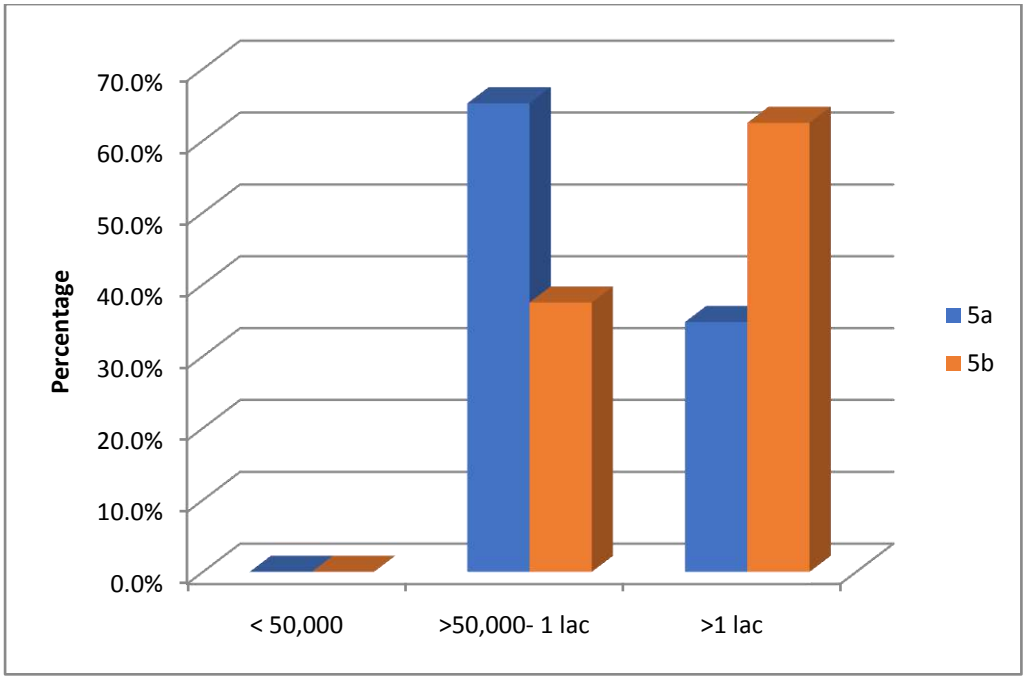


Figure 20(b2): Medical Cost

Table 20c: Relation of Specific Complications with Grade 2 and 3 of Acute Cholecystitis

- 5a= interval (delayed) cholecystectomy in grade 2 (n=5) and grade 3 (n=18)
- 5b=same admission(early) cholecystectomy in grade 3 (n=8)

		5a		5b	
ICU	Y	8	34.8%	5	62.5%
READMISSION	Y	1	4.3%	1	12.5%
RE-ADMSSN PAIN ABDO	Y	0	0.0%	1	12.5%
JAUNDICE	Y	1	4.3%	0	0.0%
PORT SITE COMPLI	Y	0	0.0%	0	0.0%
INTRA OP COMPLI	Y	3	13.0%	6	75.0%
POST OP COMPLI	Y	1	4.3%	4	50.0%
INTRAOP -BLEED FROM ADJ TISSUES	Y	1	4.3%	5	62.5%
BLD FROM CYSTIC ARTERY	Y	1	4.3%	4	50.0%
CBD INJURY	Y	0	0.0%	0	0.0%
IATROGENIC GB PERF	Y	2	8.7%	3	37.5%
GALL STONES SPILLAGE	Y	1	4.3%	2	25.0%
BILE LEAK	Y	1	4.3%	4	50.0%
SUBHEP COLLECTION	Y	1	4.3%	2	25.0%
PULM COMPLICATIONS	Y	1	4.3%	2	25.0%
SSI	Y	0	0.0%	0	0.0%
MORTALITY	Y	0	0.0%	0	0.0%
Total		23	100.0%	8	100.0%

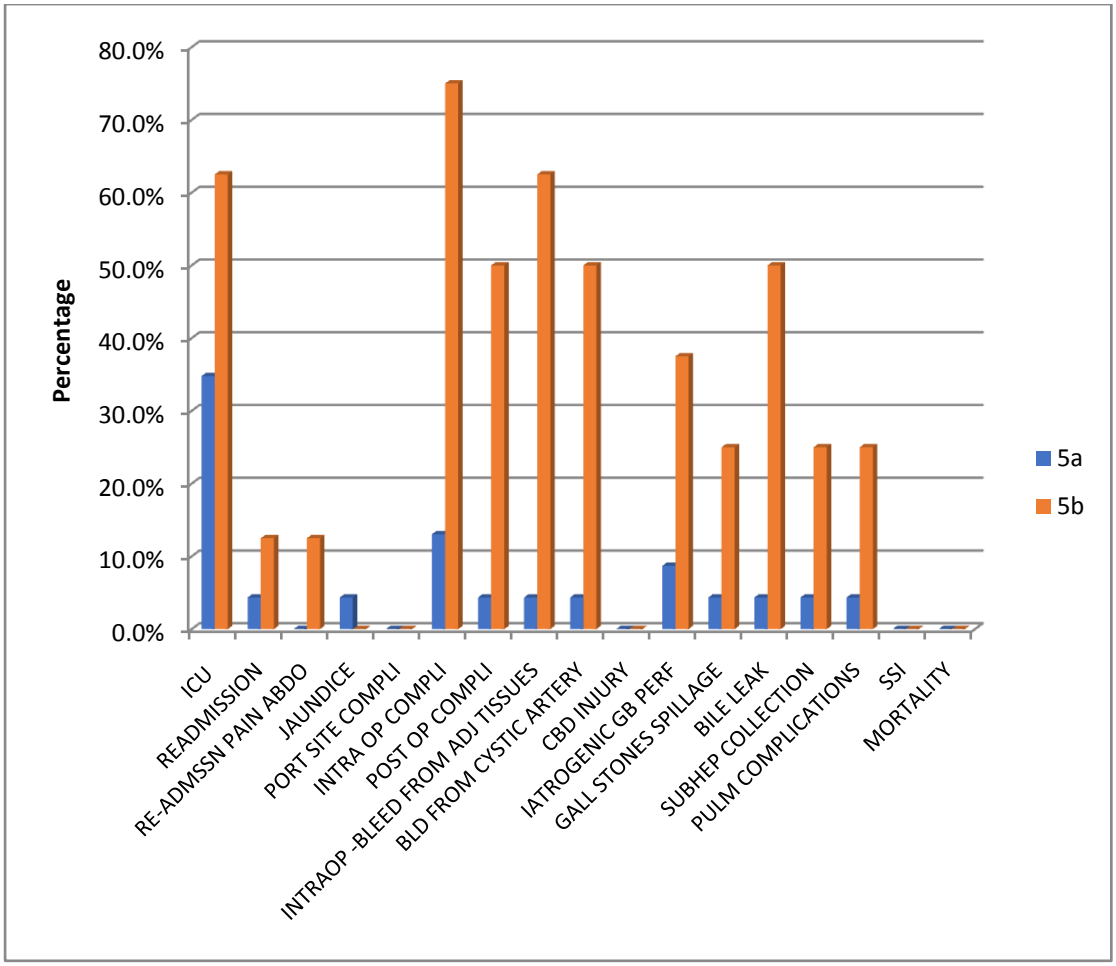


Figure 20c: Relation of Complications with Grade 2 and 3 of Acute Cholecystitis

DISCUSSION

A prospective observational study had been performed on 100 patients of acute cholecystitis who underwent plan of therapy (percutaneous transhepatic gallbladder drainage /cholecystectomy) and their outcomes based on certain parameters which decide the severity gradings such as mild, moderate or severe acute cholecystitis according to Tokyo Guidelines (TG13) from 1st Nov 2018 to 31st Oct 2019 in the Department of General surgery Dayanand Medical College and Hospital, Ludhiana.

Out of 100 patients, 12 patients were graded as mild (Grade 1) of acute cholecystitis having mild inflammatory changes with no organ dysfunction.

55 patients were graded as moderate (Grade 2) of acute cholecystitis of which 13/55 patients (23.6%) were having elevated white cell counts (> 18,000 cells per cubic millimeter), 24/55 patients (43.6%) were having palpable tender mass, 52/55 patients (94.5%) were having duration of complaints >72 hours, 3/55 patients (5.5%) were having gangrenous cholecystitis, 3/55 patients (5.5 %) were having pericholecystic abscess, 2/55 patients (3.6%) were having hepatic abscess, 4/55 patients (7.3%) were having biliary peritonitis, 1/55 patient (1.8%) was having emphysematous cholecystitis.

33 were graded as severe (Grade 3) of acute cholecystitis having one or more organ dysfunction of which 17/33 patients (51.5%) were having hypotension requiring ionotropic support, 2/33 patients (6.1%) were having neurological dysfunction, 7/33 patients (21.2%) were having respiratory dysfunction requiring oxygen support, 26/33 patients (78.8%) were having renal dysfunction having creatinine level >2 mg/dL), 12/33 patients (36.4%) were having hepatic dysfunction (prothrombin time international normalised ratio>1.5), 10/33 patients (30.3%) were having hematological dysfunction (platelet count <100,000 per cubic millimeter).

4 patients were excluded from the study because one got expired in the ICU and 3 patients with grade 3 acute cholecystitis took discharge against medical advice after PCD.

Intraoperative complications and post-operative complications from post-operative day 0 to post-operative day 7 for various grades were compared to decide the outcome for various patient with acute cholecystitis.

DEMOGRAPHICS OF STUDY

AGE

Mean age of all patients was 54.97 years. Patients have been divided into 3 age groups. 21 patients were <40 years, 43 patients were 41-60 years, 36 patients were >60 years of age. 50 % of the patients of grade 1 and 52.7% patients of grade 2 were between 41-60 years of age, 66% of the patients of grade 3 were >60years of age (6^{th} and 7^{th} decade).

Study conducted by **Adam A. Hatzidakis**[42] in 60 patients observed mean age 80.3 years (69–93 year). Another study conducted by **Deepak et al**[13] concluded maximum incidence of cholecystitis in 5^{th} and 6^{th} decade. According to our study, more is the age, more is the severity grade of acute cholecystitis with p value =0.001(**significant**).

GENDER

It has been found in this study performed on 100 patients that 43 patients were females and 57 were males. **Adam A. Hatzidakis**[42] observed in his study 54 were men and 46 were women. Another study by **Deepak et al**[13] concluded 40 were males and 60 were females. Study by **Boland et al**[43] observed similar findings in his study on 82 patients with 54 patients were males and 46 were females**.** In contrary to this study conducted by **Bansal et al**[4] observed cholecystitis 35 males and 55 females.

SYMPTOMS

In our study, murphy's sign was found in 51% of the patients in per abdomen findings and palpable tender mass was found in 52% patients. Patients with grade 1 acute cholecystitis were having murphy's sign in 91% (11/12) patients, in grade 2 in 63.3% (35/55) of

the patients and in grade 3 seen in 15.2% (5/33) of the patients. In contrast the study conducted by **G. Paul Wright**[44] murphys sign was present in only 19.1 % (85/407) of the patient with maximum patients were of grade 2. So, in our study, as the grade increased, murphys was present in decreasing frequency.

COMORBIDITIES

Out of 100 patients, 34 patients were having diabetes and 36 patients were having other comorbidities like hypertension, CKD, pulmonary complications, thyroid abnormalities, CAD, hematological dysfunction, hepatic dysfunction in combination. In our study in grade 1, 25% patients were diabetic and 8.3% were having other co morbidities. In grade 2, 21.8% patients were diabetic and 25.5% patients were having other co-morbidities where as in grade 3, 57.6% patients were having diabetes and 63.6% patients were having other co- morbidities. In the study conducted by **Vinoban Amirthalingam et al**[23] in grade 1, 17% patients were diabetic; 30.6 % patients were diabetic in grade 2 and 50% patients were having diabetes in grade 3. Therefore, in our study patients having diabetes were having more severity of acute cholecystitis having p value =0.002, turns out to be **significant**.

PROCEDURE

In this study 62% patients underwent immediate laparoscopic cholecystectomy and 35% patients underwent percutaneous cholecystostomy. Patients with mild (grade 1) acute cholecystitis, 12/12 patients (100%) underwent early laparoscopic cholecystectomy. Patients with moderate (grade 2) acute cholecystitis, 50/55 underwent early laparoscopic cholecystectomy without PCD. Among these, conversion rate to open cholecystectomy was found in 6% (3/50) of the patients due to intraoperative bile duct injury. 5/55 patients underwent percutaneous cholecystostomy due to biliary peritonitis, hepatic abscess or pericholecystic abscess. These patients underwent interval laparoscopic cholecystectomy, no intraoperative or postoperative complications were encountered in these patients. In contrast, study conducted by **F Chikamori et al**[36] conversion rate to open cholecystectomy in patients with early laparoscopic cholecystectomy

without PCD was found in 33% (3/9), in cases treated with early laparoscopic cholecystectomy following PCD was found in 3% (1/31) of the patients and in cases treated with delayed laparoscopic cholecystectomy following PCD was found in 33% (4/12) of the patients.

In the study conducted by **Kim et al**[37] reported that the conversion rate to open cholecystectomy in laparoscopic cholecystectomy after 72 hr of admission following PCD vs non-PCD in patients with acute cholecystitis was 15% (4/27) vs 23% (3/13) respectively.

Patients with severe (grade 3) acute cholecystitis(n=33), 3 patients underwent immediate laparoscopic cholecystectomy and all of them had intraoperative complications whereas 30 patients (90%) underwent percutaneous cholecystostomy out of which 18 patients underwent interval(delayed) laparoscopic cholecystectomy, 3/18 had intraoperative complications and 8 patients underwent laparoscopic cholecystectomy during same admission(early) , of which 6 patients had intraoperative complications. Higher is the severity grading, more conservative is the approach.

Also, in this study, PCD followed by delayed laparoscopic cholecystectomy was the appropriate treatment of choice and the results came out to be significant (p=0.001).

HOSPITAL STAY

In this study, in mild (grade 1) acute cholecystitis, 11/12 patients (91.7%) were having average hospital stay of 1-2 days. In moderate (grade 2) acute cholecystitis, 32/55 patients (58.2%) were having average hospital stay of 1-2 days, 13/55 patients (23.6%) were having post-operative hospital stay of 3-7 days. In severe (grade 3) acute cholecystitis 13/33 patients (39.4%) were having post-operative hospital stay >7 days and 18/33 patients (54.5%) had an ICU stay. In the study of **Ambe et al**[51] mean length of postoperative hospital stay in grade 1,2 and 3 were 6, 7.8 and 10.4 days respectively. Post-operative ICU management was seen in 42.3 % of the patients with grade 3 acute cholecystitis. In the study by **Wei-Chun Cheng et al**[45] hospital stay of grade 3 patients was significantly longer than that of

grade 1 and 2 (15.2 days, 9.2 days and 7.3 days, respectively). Also, regardless of the severity grading the patients who underwent percutaneous cholecystostomy had a longer hospital stay than those who received antibiotic treatment or surgery.

So, in present study the range of the hospital stay attributed to the fact that the patients with complications, more severity grading and patients who had an ICU stay postoperatively, sequentially led to prolonged hospital stay and the p value =0.0001, turns out to be **significant**.

COMPLICATIONS

In this study it has been observed that overall intraoperative complications rate was found more in higher severity grading patients. In mild (grade 1) patients, intraoperative complication rate and postoperative complication rate was found to be in 8.3% (1/12) patients each. In moderate (grade 2) patients, intraoperative complication rate was found to be in 16.4% (9/55) patients among which most common complication was found to be bleeding from adjacent tissues (7.3%) followed by intraoperative common bile duct injury (5.5%) and postoperative complication rate was 10.9% (6/55), most frequent complication was subhepatic collection (7.3%). Grade 2 patients who underwent PCD followed by interval (delayed) cholecystectomy i.e. 5/55 patients (9.1%) had no complications overall.

In severe (grade 3) patients overall intraoperative complication was found to be in 36.4% (12/33) in comparison to postoperative complication rate of 15.2% (5/33) , among which most common intraoperative complication was found to be bleeding from adjacent tissues (27.3%) followed by iatrogenic gall bladder perforation (21.2%), bleeding from cystic artery (18.2%) and most frequent postoperative complication was bile leak (15.2%) followed by subhepatic collection (9.1%) and pulmonary complications (9.1%). Grade 3 patients who underwent PCD insertion followed by interval (delayed) cholecystectomy (18/33) were having intraoperative complications in 13% (3/18) of the patients and post-operative complications were found in 4.3% (1/18) of the patients. In comparison, patients who underwent PCD insertion followed by same admission

(early) cholecystectomy (8/33) were having intraoperative complications in 75% (6/8) of the patients, most common being iatrogenic perforation (75%) and post-operative complications were found in 50% (4/8) of the patients, most common being bile leak (50%). In a study conducted by **Shou wu lee et al**[52] on 161 patients (4.3%) in grade 1 had post-operative complications, 5/60 patients (8.3%) in grade 2 had post-operative complications and 2/14 patients (14.3%) in grade 3 had post-operative complication. Bile leak was the most common post-operative complication occurred in 3 patients who underwent early laparoscopic cholecystectomy v/s 1 patient who underwent delayed laparoscopic cholecystectomy. Other complications in his study such as bleeding from adjacent tissues, wound infection or abscess were less commonly found.

In a study conducted by **Gurusamy KS et al**[46] on 438 patients, reported bile duct injuries in 3.2% patients undergoing early lap cholecystectomy v/s 0% in delayed lap cholecystectomy.

In this study, patients who underwent PCD followed by interval(delayed) laparscopic cholecystectomy had less intraoperative and post-operative complications in comparison to the patients who underwent PCD followed by same admission laparoscopic cholecystectomy, and the p value = 0.043 which turns out to be **significant**.

MEDICAL COST

Patients with grade 1 (12/12) and grade 2 (47/55) acute cholecystitis undergoing immediate laparoscopic cholecystectomy were having medical cost < Rs 50,000 due to short hospital stay, least complications and low readmission rate. Patients undergoing PCD followed by interval cholecystectomy in grade 2 and 3 acute cholecystitis were having cost >50,000- 1 lac whereas patients with grade 3 acute cholecystitis who underwent same admission cholecystectomy were having cost >1 lac due to ICU stay in view of organ failure, PCD insertion and more intraoperative complications which overall increases the hospital stay .In this study more is the severity grading , more is the conservative management with PCD ,

more is the hospital stay length hence increasing the overall medical cost of the patient. In this study p value = 0.0001, comes out to be **significant**.

MORBIDITY AND MORTALITY

In our study, the morbidity rate in lap cholcystectomy following PCD vs non-PCD patients with acute cholecystitis was 42 % (14/31) vs 33% (20/65) respectively. In our study out of 100 patients, 1% was the mortality rate found in patient of grade 3 acute cholecystitis with renal, neurological, hepatic and hematological dysfunction with diabetes. In the study conducted by **Kim et al**[37] reported the morbidity rate in lap cholecystectomy following PCD vs non-PCD patients with acute cholecystitis was 15% (4/27) vs 15% (2/13). Patients with more severity grading were having more complications and more of readmissions, therefore, higher grade of acute cholecystitis is directly proportional to patient's morbidity.

SUMMARY AND CONCLUSION

This prospective observational study was conducted on 100 patients who presented with diagnosis of acute cholecystitis to department of surgery at Dayanand Medical College and Hospital from 1st Nov 2018 to 31st Oct 2019. Patients were categorized into mild, moderate and severe grades according to Tokyo guidelines 13. 12 patients were grouped under mild grade, 55 patients under moderate and 33 patients were under severe grading.

The findings from the present study demonstrate that in higher grades of acute cholecystitis, patients who underwent Percutaneous Cholecystostomy followed by interval(delayed) laparoscopic cholecystectomy had less intraoperative and post-operative complications in comparison to the patients who underwent Percutaneous Cholecystostomy followed by same admission(early) laparoscopic cholecystectomy and there was significant difference in the results. Patients who underwent percutaneous cholecystostomy had a longer hospital stay than those who received treatment with antibiotics or surgery. Patients with complications, more severity grading and patients who had an ICU stay postoperatively, sequentially led to prolonged hospital stay. With conservative management, more was the overall medical cost of the patient, higher grade of acute cholecystitis is directly proportional to patient's morbidity in terms of complications and re- admissions.

In this study patients with acute cholecystitis, conversion rate to open cholecystectomy in laparoscopic cholecystectomy following PCD was negligible in comparison of cases without PCD patients with acute cholecystitis.

Higher is the severity grading, more conservative is the management. PCD followed by delayed laparoscopic cholecystectomy was the appropriate treatment of choice, having less intraoperative and post-operative complications, reducing the procedure related morbidity of the patients with severe grades.

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KEY TO MASTER CHART

VITALS	
Normal	-0
Hypotension	-1
Tachycardia	-2
Tachypnoea	-3
Febrile	-4
DURATION OF COMPLAINTS	
<72hrs	-1
>72hrs	-2
PER ABDOMEN	
Palpable tender mass	-1
Murphys sign	-2
TLC	
<18	-1
>18	-2
SERUM BILIRUBIN	
NORMAL	-0
RAISED	-1
PLATELET COUNTS	
>1 LAKH	-0
<1 LAKH	-1
ALP	
NORMAL	-1
RAISED	-2

S.AMYLASE/ LIPASE

NORMAL	-0
RAISED	-1

PTI/INR

<1.5	-0
>1.5	-1

CREATININE

<2.0 mg/dl	-0
>2.0 mg/dl	-1

Co-morbidities

None	-0
Diabetes	-1
Others	-2

IMAGING FINDINGS (UGS/CT/MRCP)

Inflammatory changes	-1
(GB wall thickened >4mm , OVERDISTENDED GB)	
Gall stones/ debris	-2
Acalculous cholecystitis	-3
Gangrenous cholecystitis	-4
Pericholecystic abscess	-5
Hepatic abscess	-6
Biliary peritonitis	-7
Emphysematous cholecystitis	-8
Mild pancreatitis	-9
Acute on Chronic Cholecystitis	-10

NEUROLOGICAL STATUS

Conscious	-0
Decreased consciousness	-1

GRADE OF ACUTE CHOLECYSTITIS

Mild	-1
Moderate	-2
Severe	-3

PROCEDURE PERFORMED

Laparoscopic cholecystectomy	-1
Laparoscopic conv to open	-2
Open cholecystectomy	-3
Percutaneous cholecystostomy	-4
PC f/b cholecystectomy	
INTERVAL	-5a
SAME ADMISSION	-5b

COMPLICATIONS

INTRAOP COMPLICATIONS	1
Bleeding from tissues adj to GB	-1
Bleeding from cystic artery	-2
CBD injury	-3
Iatrogenic perf. Of GB	-4
Bleeding from port sites	-5
Spillage of gall stones	-6
Bowel injury	-7
POST OP DAYS 1-7	-2
Bleeding from abdo wall cavity (>100ml/24hrs)	-1

Bile leak (>50/100)ml/24hrs	-2
Subhepatic collection	-3
Hematoma abdominal wall	-4
Pulmonary complications	-5
Lost gall stone abscess	-6
SSI	-7
HOSPITAL STAY(post op) / ICU STAY	
1-2 days	-1
3-7 days	-2
>7 days	-3
ICU	-4
READMISSION	
No-	-0
Yes	-1
reason for readmission	
pain abdomen	-1
jaundice	-2
port site complication	-3
MORTALITY	**-Y**
MEDICAL COST	
Upto 50,000	-1
50k-1 lac	-2
>1 lac	-3

S. NO	PATIENTS NAME	MRD NO.	DOA	DOD	AGE	Age group	SEX	HYPOTENSION	TACHYCARDIA	TACHYPONEA	FEBRILE	DURATION OF COMPLAINTS	MURPHYS SIGN	PALPABLE TENDER MASS	DIABETES	OTHERS	TLC	BILIRUBIN - T/D/I	ALP	PLT <1 LAKH	S.AMYLASE/ LIPASE	PTI/ INR
1	SD	662120	1/30/2019	2/15/2019	55	2	M	N	y	N	y	1	N	N	Y	N	2	0	2	1	1	0
2	AS	659240	1/24/2019		87	3	F	y	Y	y	y	2	N	y	y	y	2	1	1	1	0	1
3	LD	643456	12/26/2018	1/16/2019	57	2	F	y	Y	N	Y	1	N	y	y	N	2	0	1	0	0	1
4	KD	54534	12/25/2018	1/17/2019	81	3	F	N	y	N	Y	2	N	y	Y	y	2	0	1	0	0	0
5	AS	662312	1/30/2019	20-Feb	82	3	M	y	y	N	y	2	N	y	N	y	2	0	1	1	0	0
6	BK	47470	2/1/2019	2/14/2019	69	3	F	N	Y	N	y	2	N	y	Y	y	2	1	1	0	1	0
7	JS	617525	1/14/2019	1/27/2019	65	3	F	y	y	y	y	2	N	y	y	y	2	0	1	0	0	1
8	RS	616934	11/10/2018	11/17/2018	52	2	F	y	y	N	N	2	N	y	y	y	2	0	1	1	1	0
9	RK	279002	11/18/2018	11/21/2018	37	1	F	N	y	N	y	2	N	y	Y	y	2	0	1	0	0	0
10	B	618455	11/12/2018	11/16/2018	48	2	F	N	Y	Y	N	2	N	Y	N	N	2	0	1	0	0	0
11	GK	636158	12/12/2018	12/14/2018	50	2	F	N	N	N	N	1	Y	N	N	N	1	0	1	0	0	0
12	US	826197	10/8/2019	10/13/2019	87	3	M	N	N	N	N	2	Y	Y	Y	N	1	0	1	0	0	0
13	JR	827615	10/11/2019	10/12/2019	63	3	F	N	N	N	Y	2	Y	N	Y	N	1	0	1	0	0	0
14	SK	818175	9/25/2019	10/6/2019	48	2	M	N	Y	N	Y	1	Y	Y	N	N	2	0	2	0	1	0
15	BS	641249	1/15/2019	1/24/2019	73	3	M	N	N	N	Y	2	N	Y	Y	N	2	0	1	0	0	0
16	DC	656749	1/19/2019	2/2/2019	60	2	M	N	N	N	N	2	Y	N	N	Y	1	1	1	0	0	0
17	RB	628204	11/30/2018	12/2/2018	39	1	F	N	N	N	N	2	Y	N	N	N	1	0	1	0	0	0
18	KS	624320	11/22/2018	11/26/2018	42	2	M	N	N	N	N	2	Y	N	N	N	2	0	1	0	0	0
19	SPK	358920	1/18/2019	1/21/2019	51	2	M	N	N	N	N	1	Y	N	Y	N	1	0	1	0	0	0
20	SD	662120	1/30/2019	2/6/2019	85	3	F	Y	N	N	Y	2	N	Y	Y	Y	2	0	2	0	1	1
21	J	629603	11/30/2018	12/20/2018	73	3	F	Y	N	N	N	2	N	Y	Y	N	2	0	1	0	0	0
22	BD	404381	12/4/2018	12/10/2018	61	3	M	N	N	N	N	2	N	Y	Y	N	2	0	1	1	0	0
23	S	385477	12/10/2018	12/14/2018	41	2	F	N	N	N	N	2	N	Y	N	N	1	0	2	0	1	0
24	SA	871897	11/19/2019	11/30/2019	88	3	M	Y	N	N	N	2	N	Y	N	Y	2	0	1	0	0	0
25	BD	159392	9/24/2019	10/3/2019	72	3	F	N	N	N	N	2	Y	N	Y	N	1	0	2	0	1	0
26	KK	817296	10/3/2019	10/5/2019	75	3	F	N	N	N	N	2	Y	N	Y	N	1	0	1	0	0	0
27	S	619192	11/13/2018	11/15/2018	55	2	M	N	N	N	N	2	Y	N	N	N	1	0	1	0	0	0
28	RS	166893	11/26/2018	11/27/2018	63	3	F	N	N	N	N	2	N	N	N	N	1	0	1	0	0	0
29	MK	629917	12/6/2018	12/13/2018	50	2	F	N	N	N	N	2	Y	N	N	N	1	0	1	0	0	0
30	PC	620174	12/8/2018	12/15/2018	73	3	M	N	N	N	N	1	N	Y	N	Y	2	0	1	1	0	1
31	AK	578032	9/9/2019	9/12/2019	45	2	F	N	N	N	N	2	N	N	N	N	1	1	1	0	0	0
32	RK	924006	4/27/2019	5/1/2019	55	2	M	N	Y	N	N	2	N	Y	Y	N	2	1	1	0	0	0
33	SS	768667	7/16/2019	7/20/2019	80	3	M	N	N	N	N	2	N	Y	N	N	1	0	1	0	0	0
34	RG	773377	7/23/2019	7/25/2019	59	2	M	N	N	N	Y	2	N	Y	Y	Y	1	0	1	0	0	0
35	SK	766859	7/13/2019	7/26/2019	64	3	M	Y	Y	N	Y	1	N	Y	N	Y	2	1	2	0	1	1
36	TS	932627	6/7/2019	6/17/2019	62	3	M	N	N	N	N	1	N	Y	N	Y	2	0	1	0	0	1
37	GS	918698	3/18/2019	3/23/2019	80	3	M	N	N	N	Y	2	N	N	Y	N	1	0	1	0	0	0
38	NS	656129	1/18/2019	2/7/2019	62	3	M	N	Y	N	Y	2	N	Y	N	N	2	0	1	0	0	0
39	GK	925944	5/10/2019	5/14/2019	52	2	M	N	N	N	N	1	Y	Y	N	Y	1	0	1	0	0	0
40	M	628294	11/28/2018	12/5/2018	30	1	M	N	N	N	N	2	N	Y	N	Y	1	1	1	1	0	0
41	HS	640053	12/22/2018	12/25/2018	44	2	M	N	N	N	N	2	Y	Y	N	N	1	1	2	0	1	0
42	MR	643956	12/26/2018	12/29/2018	60	2	M	N	N	N	N	2	Y	N	N	N	1	0	1	0	0	0
43	JK	635451	12/10/2018	12/14/2018	39	1	M	N	N	N	N	1	Y	N	Y	N	1	0	1	0	0	0
44	P	626049	11/25/2018	12/13/2018	40	1	F	N	Y	N	N	2	Y	N	N	N	1	0	1	0	0	0
45	R	616934	11/10/2018	11/12/2018	52	2	M	N	N	N	N	1	N	N	N	N	1	0	1	0	0	0
46	S	619192	11/13/2018	11/15/2018	55	2	M	N	N	N	N	2	Y	Y	N	N	1	0	1	0	0	0
47	RK	279002	11/18/2018	11/24/2018	37	1	M	N	N	N	Y	2	Y	Y	N	N	2	0	1	0	0	0
48	RS	166893	11/26/2018	11/27/2018	63	3	F	N	N	N	N	2	N	N	N	N	1	0	1	0	0	0
49	PR	896401	11/1/2018	11/15/2018	52	2	F	N	Y	N	Y	2	N	Y	Y	N	2	0	1	1	1	1
50	RK	874303	12/2/2018	12/10/2018	65	3	M	Y	Y	Y	Y	2	N	Y	Y	Y	2	1	2	1	1	0
51	MK	892676	10/4/2018	10/9/2018	82	3	M	Y	N	N	Y	2	N	Y	N	Y	2	0	2	0	0	0
52	AS	659240	1/24/2019	1/26/2019	37	1	F	N	N	N	N	2	Y	Y	N	N	1	0	1	0	0	0
53	SS	440019	1/8/2019	1/10/2019	29	1	M	N	N	N	N	2	N	Y	N	N	1	0	1	0	0	0
54	KR	561126	12/2/2018	12/8/2018	60	2	F	N	N	N	N	2	N	y	N	N	1	0	1	0	0	0
55	MK	645096	12/28/2018	1/1/2019	50	2	F	N	Y	N	Y	1	Y	N	N	N	1	0	1	0	0	0

S. NO	PATIENTS NAME	MRD NO.	DOA	DOD	AGE	Age group	SEX	HYPOTENSION	TACHYCARDIA	TACHYPONEA	FEBRILE	DURATION OF COMPLAINTS	MURPHYS SIGN	PALPABLE TENDER MASS	DIABETES	OTHERS	TLC	BILIRUBIN - T/D/I	ALP	PLT <1 LAKH	S.AMYLASE/ LIPASE	PTI/ INR
56	HS	32181	12/16/2018	12/17/2018	45	2	M	N	N	N	N	2	Y	Y	N	N	1	0	1	0	0	0
57	BK	672369	2/18/2019	2/21/2019	50	2	F	N	N	N	N	2	Y	N	Y	N	1	0	1	0	0	0
58	KS	801454	5/20/2019	5/30/2019	78	3	M	Y	Y	Y	Y	2	N	y	N	y	2	1	2	0	0	0
59	SC	690575	3/18/2019	3/28/2019	56	2	M	N	N	N	N	1	Y	N	N	N	2	0	1	0	0	0
60	RK	946228	7/22/2019	7/30/2019	65	3	F	Y	Y	Y	Y	2	N	Y	Y	Y	2	0	1	0	0	0
61	SS	635476	12/10/2018	12/25/2018	50	2	M	Y	Y	N	N	2	N	Y	Y	N	2	0	1	0	0	1
62	SK	621938	12/18/2018	12/26/2018	26	1	F	N	Y	N	N	2	Y	N	N	N	1	0	1	0	1	0
63	GK	201964	12/17/2018	12/19/2018	38	1	F	N	N	N	N	1	Y	N	N	N	1	0	1	0	0	0
64	SR	813764	9/16/2019	9/26/2019	48	2	F	N	N	N	N	2	N	Y	N	Y	2	1	2	0	0	0
65	PS	840133	11/11/2018	11/13/2018	45	2	M	N	N	N	N	2	Y	N	N	N	1	0	1	0	1	0
66	DG	686636	3/11/2019	3/13/2019	38	1	F	N	N	N	N	1	Y	N	N	N	1	0	1	0	0	0
67	AM	339056	3/11/2019	3/12/2019	29	1	M	N	N	N	N	2	Y	N	N	Y	1	0	1	0	0	0
68	SR	514681	3/11/2019	3/13/2019	62	3	F	N	N	N	N	2	N	N	Y	Y	1	0	1	0	0	0
69	JK	680314	3/12/2019	3/14/2019	28	1	F	N	N	N	N	1	Y	N	N	N	1	0	1	0	0	0
70	KS	801454	2/2/2019	2/15/2019	48	2	M	Y	Y	Y	Y	2	Y	Y	N	N	2	0	2	0	0	0
71	MH	823786	10/5/2019	10/17/2019	74	3	M	N	Y	N	Y	2	N	N	Y	Y	2	1	2	0	0	1
72	JK	758170	11/7/2019	11/15/2019	61	3	F	N	N	N	N	2	Y	N	N	N	1	0	1	0	0	0
73	GL	823165	11/18/2019	11/27/2019	52	2	M	N	Y	N	Y	2	Y	N	N	Y	1	0	1	0	0	0
74	RK	653473	11/19/2019	12/2/2019	65	3	M	Y	N	N	N	1	y	Y	N	Y	2	0	1	0	0	0
75	MR	643957	12/26/2018	12/30/2018	60	2	M	N	N	N	N	2	Y	N	Y	N	1	0	1	0	1	0
76	HS	32181	12/16/2018	12/17/2018	45	2	M	N	N	N	N	2	Y	N	N	N	1	0	1	0	0	0
77	KC	339720	9/20/2019	10/2/2019	70	3	M	N	N	N	Y	2	N	Y	Y	N	2	0	1	0	1	0
78	SK	853841	11/18/2019	11/29/2019	35	1	M	N	Y	N	Y	2	N	Y	N	N	2	0	1	0	0	0
79	AG	840180	10/31/2019	11/6/2019	32	1	F	N	Y	N	Y	2	Y	Y	N	N	1	0	1	0	0	0
80	AKM	840189	10/31/2019	11/7/2019	78	3	M	Y	N	Y	Y	2	Y	Y	Y	Y	2	1	1	1	0	1
81	MK	853827	11/21/2019	12/1/2019	40	1	F	N	N	N	N	2	N	N	N	N	2	1	2	0	0	0
82	MG	853436	11/21/2019	11/30/2019	55	2	M	Y	Y	N	Y	2	Y	Y	Y	Y	2	1	1	0	0	0
83	BS	652577	1/12/2019	1/20/2019	62	3	M	N	Y	N	Y	2	N	N	N	Y	2	0	2	0	0	0
84	RK	841080	11/1/2019	11/9/2019	50	2	F	N	N	N	N	2	Y	N	N	N	1	0	1	0	0	0
85	NL	629662	12/21/2018	12/26/2018	60	2	M	N	N	N	Y	1	Y	N	Y	N	1	0	1	0	0	0
86	SS	619448	1/7/2019	1/9/2019	58	2	M	N	N	N	N	2	N	Y	N	Y	1	0	1	0	0	0
87	CK	663782	2/2/2019	2/14/2019	21	1	F	Y	Y	N	Y	2	N	N	N	N	2	1	2	0	0	0
88	KD	627492	11/12/2018	11/15/2018	60	2	F	N	N	N	N	2	Y	Y	N	N	1	0	1	0	0	0
89	VB	645274	12/29/2018	12/31/2018	69	3	F	N	N	N	N	2	N	N	N	Y	1	0	1	0	0	0
90	US	643789	1/18/2019	1/21/2019	82	3	M	N	N	N	Y	1	Y	N	N	Y	1	0	1	0	0	0
91	RK	654234	1/15/2019	1/18/2019	61	3	M	N	Y	N	N	2	Y	Y	N	N	1	1	2	0	0	0
92	RL	657759	1/23/2019	1/24/2019	45	2	F	N	N	N	N	2	Y	N	N	N	1	0	1	0	0	0
93	RA	259712	1/22/2019	1/24/2019	35	1	M	N	N	N	N	2	Y	N	N	N	1	0	1	0	0	0
94	JS	659940	1/25/2019	1/31/2019	50	2	M	N	N	N	Y	1	Y	N	N	Y	2	0	1	0	0	1
95	TK	676004	2/22/2019	2/23/2019	33	1	M	N	N	N	Y	2	N	Y	N	N	1	0	1	0	0	0
96	KS	672967	2/17/2019	2/28/2019	26	1	M	N	N	N	N	2	Y	N	N	Y	2	0	1	0	1	0
97	RV	245238	3/3/2019	3/8/2019	19	1	F	N	N	N	Y	1	Y	N	N	N	1	0	2	0	1	0
98	MK	658003	2/25/2019	3/7/2019	60	2	F	N	N	N	Y	2	Y	N	N	Y	2	0	1	0	0	0
99	VS	646404	2/23/2019	1/27/2019	54	2	M	N	N	N	Y	1	Y	N	N	N	1	0	1	0	1	0
100	BJ	676746	2/23/2019	2/28/2019	43	2	M	N	N	N	N	2	N	Y	Y	Y	2	0	1	0	0	0

S. NO	PATIENTS NAME	MRD NO.	S.CREATININE	INFLAMMATORY CHANGES (GB WALL THICKENED / OVERDISTENDED GB)	GALL STONES/ DEBRIS	ACALCULOUS CHOLECYSTITIS	GANGRENOUS CHOLECYSTITIS	PERICHOLECYSTIC ABSCESS	HEPATIC ABSCESS	BILIARY PERITONITIS	EMPHYSEMATOUS CHOLECYSTITIS	MILD PANCREATITIS	ACUTE ON CHRONIC CHOLECYSTITIS	NEUROLOGICAL STATUS
1	SD	662120	1	y	Y	N	N	N	N	N	N	Y	N	0
2	AS	659240	1	Y	Y	N	N	N	N	N	Y	N	N	1
3	LD	643456	1	Y	Y	N	y	N	N	N	N	N	N	0
4	KD	54534	1	y	Y	N	N	N	N	y	N	N	N	0
5	AS	662312	1	y	Y	N	N	y	y	N	N	N	N	0
6	BK	47470	1	Y	Y	N	N	y	N	N	N	y	N	0
7	JS	617525	1	y	Y	N	y	N	N	N	N	N	N	0
8	RS	616934	0	y	Y	N	N	y	N	N	N	y	y	0
9	RK	279002	0	y	Y	N	N	N	N	y	N	N	y	0
10	B	618455	0	y	Y	N	y	Y	N	N	N	N	N	0
11	GK	636158	0	N	Y	N	N	N	N	N	N	N	N	0
12	US	826197	0	Y	Y	N	N	N	N	N	N	N	N	0
13	JR	827615	0	Y	Y	N	N	N	N	N	N	N	N	0
14	SK	818175	0	Y	Y	N	N	N	N	N	N	Y	N	0
15	BS	641249	1	Y	Y	N	N	Y	N	N	N	N	N	0
16	DC	656749	0	Y	Y	N	N	Y	N	N	N	N	N	0
17	RB	628204	0	N	Y	N	N	N	N	N	N	N	Y	0
18	KS	624320	0	N	Y	N	N	N	N	N	N	N	N	0
19	SPK	358920	0	N	Y	N	N	N	N	N	N	N	N	0
20	SD	662120	1	Y	Y	N	N	y	N	N	N	Y	N	0
21	J	629603	1	Y	Y	N	N	N	N	N	Y	N	N	0
22	BD	404381	1	y	Y	N	N	y	N	N	N	N	Y	0
23	S	385477	0	Y	Y	N	N	N	N	N	N	Y	N	0
24	SA	871897	1	Y	Y	N	N	N	N	N	Y	N	N	1
25	BD	159392	0	Y	Y	N	N	N	N	N	N	Y	N	0
26	KK	817296	0	Y	Y	N	N	N	N	N	N	N	Y	0
27	S	619192	0	N	Y	N	N	N	N	N	N	N	N	0
28	RS	166893	0	N	Y	N	N	N	N	N	N	N	N	0
29	MK	629917	0	N	Y	N	N	N	N	N	N	N	N	0
30	PC	620174	1	Y	y	N	N	Y	N	N	N	N	N	0
31	AK	578032	0	N	Y	N	N	N	N	N	N	N	N	0
32	RK	924006	0	N	y	N	Y	N	N	Y	N	N	N	0
33	SS	768667	0	Y	Y	N	N	N	N	N	N	N	N	0
34	RG	773377	0	N	y	N	N	N	N	N	N	N	Y	0
35	SK	766859	1	N	y	N	Y	N	N	Y	N	Y	N	0
36	TS	932627	0	Y	Y	N	Y	N	N	Y	N	N	N	0
37	GS	918698	0	Y	Y	N	N	N	N	Y	N	N	N	0
38	NS	656129	1	N	Y	N	N	Y	Y	N	N	N	N	0
39	GK	925944	0	Y	Y	N	N	N	N	N	N	N	N	0
40	M	628294	0	Y	Y	N	N	N	N	N	N	N	N	0
41	HS	640053	0	Y	Y	N	N	N	N	N	N	Y	N	0
42	MR	643956	0	Y	Y	N	N	N	N	N	N	N	N	0
43	JK	635451	0	N	Y	N	N	N	N	N	N	N	N	0
44	P	626049	0	N	Y	N	N	N	N	N	N	N	Y	0
45	R	616934	0	N	Y	N	N	N	N	N	N	N	N	0
46	S	619192	0	Y	Y	N	N	N	N	N	N	N	N	0
47	RK	279002	0	Y	Y	N	N	N	N	N	N	N	N	0
48	RS	166893	0	N	Y	N	N	N	N	N	N	N	N	0
49	PR	896401	0	Y	Y	N	N	N	N	Y	N	Y	N	0
50	RK	874303	1	Y	Y	N	N	Y	N	N	N	Y	N	0
51	MK	892676	0	Y	Y	N	N	N	Y	N	N	N	N	0
52	AS	659240	0	N	Y	N	N	N	N	N	N	N	N	0
53	SS	440019	0	Y	Y	N	N	N	N	N	N	N	N	0
54	KR	561126	0	Y	Y	N	N	N	N	y	N	N	N	0
55	MK	645096	0	Y	Y	N	N	N	N	N	N	N	N	0

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56	HS	32181	0	N	Y	N	N	N	N	N	N	N	N	0
57	BK	672369	0	N	Y	N	N	N	N	N	N	N	N	0
58	KS	801454	1	Y	Y	N	N	N	N	N	Y	N	N	0
59	SC	690575	0	N	Y	N	N	N	N	N	N	N	Y	0
60	RK	946228	1	Y	Y	N	N	Y	N	Y	N	N	N	0
61	SS	635476	0	Y	Y	N	N	Y	N	N	N	N	N	0
62	SK	621938	0	Y	Y	N	N	N	N	N	N	Y	N	0
63	GK	201964	0	Y	Y	N	N	N	N	N	N	N	N	0
64	SR	813764	1	Y	Y	N	N	N	Y	N	N	N	N	0
65	PS	840133	0	Y	Y	N	N	N	N	N	N	Y	N	0
66	DG	686636	0	N	Y	N	N	N	N	N	N	N	N	0
67	AM	339056	0	Y	Y	N	N	N	N	N	N	N	N	0
68	SR	514681	0	N	Y	N	N	N	N	N	N	N	N	0
69	JK	680314	0	N	Y	N	N	N	N	N	N	N	N	0
70	KS	801454	1	Y	Y	N	N	N	N	N	Y	N	N	0
71	MH	823786	0	Y	Y	N	Y	Y	N	N	N	N	N	0
72	JK	758170	0	Y	Y	N	N	N	N	N	N	N	N	0
73	GL	823165	0	Y	Y	N	N	N	N	N	Y	N	N	0
74	RK	653473	1	Y	Y	N	N	N	N	N	N	N	Y	0
75	MR	643957	0	Y	Y	N	N	N	N	N	N	Y	N	0
76	HS	32181	0	N	Y	N	N	N	N	N	N	N	N	0
77	KC	339720	1	Y	Y	N	N	N	Y	N	N	Y	N	0
78	SK	853841	1	Y	Y	N	N	N	N	N	Y	N	N	0
79	AG	840180	0	Y	Y	N	N	N	N	N	N	N	N	0
80	AKM	840189	1	Y	Y	N	N	N	N	Y	N	N	N	0
81	MK	853827	1	Y	Y	N	N	N	N	Y	N	N	N	0
82	MG	853436	1	Y	Y	N	N	N	N	Y	N	N	N	0
83	BS	652577	1	Y	Y	N	N	Y	Y	N	N	N	N	0
84	RK	841080	0	N	Y	N	N	N	N	N	N	N	N	0
85	NL	629662	0	Y	Y	N	N	N	N	N	N	N	N	0
86	SS	619448	0	Y	Y	N	N	N	N	N	N	N	N	0
87	CK	663782	0	N	Y	N	N	N	N	N	N	N	N	0
88	KD	627492	0	N	Y	N	N	N	N	N	N	N	Y	0
89	VB	645274	0	N	Y	N	N	N	N	N	N	N	N	0
90	US	643789	0	N	Y	N	N	N	N	N	N	N	N	0
91	RK	654234	0	Y	N	Y	N	N	N	N	N	N	N	0
92	RL	657759	0	N	Y	N	N	N	N	N	N	N	N	0
93	RA	259712	0	Y	Y	N	N	N	N	N	N	N	N	0
94	JS	659940	0	Y	Y	N	N	N	N	N	N	N	N	0
95	TK	676004	0	Y	Y	N	N	N	N	N	N	N	N	0
96	KS	672967	0	N	Y	N	N	N	N	N	N	Y	N	0
97	RV	245238	0	N	Y	N	N	N	N	N	N	Y	N	0
98	MK	658003	0	Y	y	N	Y	Y	N	N	N	N	N	0
99	VS	646404	0	N	Y	N	N	N	N	N	N	Y	N	0
100	BJ	676746	0	N	Y	N	N	N	N	N	N	N	N	0

S. NO	PATIENTS NAME	MRD NO.	GRADE OF ACUTE CHOLECYSTITIS	PROCEDURE	LAP CHOLE	LAP CONV TO OPEN	OPEN CHOLE	PCD	PCD F/ B SAME ADMSSN CHOLE	PCD F/B INTERVAL CHOLE	HOSPITAL / ICU STAY	ICU	MEDICAL COST	READMISSION	CAUSE OF READMSSN	RE-ADMSSN PAIN ABDO	JAUNDICE	PORT SITE COMPLI	INTRA OP COMPLI	POST OP COMPLI
1	SD	662120	3	5a	N	N	N	N	N	y	4	y	3	N	N	N	N	N	N	N
2	AS	659240	3	4	N	N	N	y	N	N	4	y	2	N	N	N	N	N	N	N
3	LD	643456	3	5b	N	N	N	N	y	N	4	y	3	N	N	N	N	N	Y	Y
4	KD	54534	3	5a	N	N	N	N	N	y	4	y	3	N	N	N	N	N	N	N
5	AS	662312	3	5a	N	N	N	N	N	y	4	y	3	y	2	N	Y	N	N	Y
6	BK	47470	3	5a	N	N	N	N	N	y	3	N	2	N	N	N	N	N	N	N
7	JS	617525	3	5b	N	N	N	N	y	N	4	y	3	N	N	N	N	N	Y	Y
8	RS	616934	3	5a	N	N	N	N	N	y	4	y	3	N	N	N	N	N	N	N
9	RK	279002	2	5a	N	N	N	N	N	y	3	N	2	N	N	N	N	N	N	N
10	B	618455	2	5a	N	N	N	N	N	y	3	N	2	N	N	N	N	N	N	N
11	GK	636158	1	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
12	US	826197	2	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	Y	N
13	JR	827615	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
14	SK	818175	2	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	N	N
15	BS	641249	3	5a	N	N	N	N	N	y	3	N	2	N	N	N	N	N	N	N
16	DC	656749	2	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	N	N
17	RB	628204	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
18	KS	624320	2	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	N	N
19	SPK	358920	1	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	Y	Y
20	SD	662120	3	5a	N	N	N	N	N	y	3	N	2	N	N	N	N	N	N	N
21	J	629603	3	5b	N	N	N	N	y	N	4	y	3	y	1	y	N	N	N	N
22	BD	404381	3	5a	N	N	N	N	N	y	3	N	2	N	N	N	N	N	N	N
23	S	385477	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
24	SA	871897	3	4	N	N	N	Y	N	N	4	Y	N	N	N	N	N	N	N	N
25	BD	159392	2	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	N	N
26	KK	817296	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
27	S	619192	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
28	RS	166893	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
29	MK	629917	2	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	N	N
30	PC	620174	3	1	Y	N	N	N	N	N	4	Y	1	N	N	N	N	N	Y	N
31	AK	578032	2	1	Y	N	N	N	N	N	1	N	1	Y	2	N	Y	N	N	Y
32	RK	924006	2	5a	N	N	N	N	N	Y	3	N	2	N	N	N	N	N	N	N
33	SS	768667	2	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	N	N
34	RG	773377	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
35	SK	766859	3	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	Y	N
36	TS	932627	3	5a	N	N	N	N	N	Y	4	Y	3	N	N	N	N	N	N	N
37	GS	918698	2	1	y	N	N	N	N	N	2	N	1	N	N	N	N	N	Y	N
38	NS	656129	3	5a	N	N	N	N	N	Y	4	Y	3	N	N	N	N	N	Y	N
39	GK	925944	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
40	M	628294	3	5a	N	N	N	N	N	Y	3	N	2	N	N	N	N	N	N	N
41	HS	640053	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
42	MR	643956	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
43	JK	635451	1	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
44	P	626049	2	2	N	Y	N	N	N	N	4	Y	2	N	N	N	N	N	Y	N
45	R	616934	1	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
46	S	619192	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
47	RK	279002	2	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	Y	N
48	RS	166893	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
49	PR	896401	3	5a	N	N	N	N	N	Y	4	Y	3	N	N	N	N	N	Y	N
50	RK	874303	3	4	N	N	N	Y	N	N	4	N	N	N	N	N	N	N	N	N
51	MK	892676	2	5a	N	N	N	N	N	Y	3	N	2	N	N	N	N	N	N	N
52	AS	659240	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
53	SS	440019	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
54	KR	561126	2	5a	N	N	N	N	N	y	3	N	2	N	N	N	N	N	N	N
55	MK	645096	1	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N

S. NO	PATIENTS NAME	MRD NO.	GRADE OF ACUTE CHOLECYSTITIS	PROCEDURE	LAP CHOLE	LAP CONV TO OPEN	OPEN CHOLE	PCD	PCD F/ B SAME ADMSSN CHOLE	PCD F/B INTERVAL CHOLE	HOSPITAL / ICU STAY	ICU	MEDICAL COST	READMISSION	CAUSE OF READMSSN	RE-ADMSSN PAIN ABDO	JAUNDICE	PORT SITE COMPLI	INTRA OP COMPLI	POST OP COMPLI
56	HS	32181	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
57	BK	672369	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
58	KS	801454	3	5b	N	N	N	N	Y	N	4	Y	3	N	N	N	N	N	Y	Y
59	SC	690575	2	2	N	Y	N	N	N	N	3	N	2	N	N	N	N	N	Y	Y
60	RK	946228	3	5a	N	N	N	N	N	Y	4	Y	3	N	N	N	N	N	N	N
61	SS	635476	3	5b	N	N	N	N	Y	N	3	N	2	N	N	N	N	N	y	N
62	SK	621938	2	1	Y	N	N	N	N	N	1	N	1	y	2	N	y	N	N	N
63	GK	201964	1	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
64	SR	813764	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	Y	N
65	PS	840133	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
66	DG	686636	1	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
67	AM	339056	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
68	SR	514681	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
69	JK	680314	1	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
70	KS	801454	3	5b	N	N	N	N	Y	N	4	Y	3	N	N	N	N	N	Y	Y
71	MH	823786	3	5a	N	N	N	N	N	Y	3	N	2	N	N	N	N	N	N	N
72	JK	758170	2	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	N	N
73	GL	823165	2	2	N	Y	N	N	N	N	3	N	2	y	1	Y	N	N	Y	N
74	RK	653473	3	5b	N	N	N	N	Y	N	3	N	2	N	N	N	N	N	N	N
75	MR	643957	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
76	HS	32181	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
77	KC	339720	3	5a	N	N	N	N	N	Y	3	N	2	N	N	N	N	N	N	N
78	SK	853841	3	5b	N	N	N	N	Y	N	3	N	2	N	N	N	N	N	Y	N
79	AG	840180	2	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	N	N
80	AKM	840189	3	4	N	N	N	Y	N	N	4	Y	N	N	N	N	N	N	N	N
81	MK	853827	3	5a	N	N	N	N	N	Y	3	N	2	N	N	N	N	N	N	N
82	MG	853436	3	5a	N	N	N	N	N	Y	3	N	2	N	N	N	N	N	Y	N
83	BS	652577	3	5a	N	N	N	N	N	Y	3	N	2	N	N	N	N	N	N	N
84	RK	841080	2	1	Y	N	N	N	N	N	2	N	1	Y	3	N	N	Y	N	Y
85	NL	629662	1	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
86	SS	619448	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
87	CK	663782	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	Y	Y
88	KD	627492	2	1	Y	N	N	N	N	N	3	N	1	y	1,2	Y	Y	N	N	Y
89	VB	645274	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
90	US	643789	1	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
91	RK	654234	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
92	RL	657759	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
93	RA	259712	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
94	JS	659940	3	1	Y	N	N	N	N	N	2	N	N	N	N	N	N	N	Y	N
95	TK	676004	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
96	KS	672967	2	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	N	N
97	RV	245238	1	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N
98	MK	658003	2	1	Y	N	N	N	N	N	3	N	1	N	N	N	N	N	Y	Y
99	VS	646404	1	1	Y	N	N	N	N	N	2	N	1	N	N	N	N	N	N	N
100	BJ	676746	2	1	Y	N	N	N	N	N	1	N	1	N	N	N	N	N	N	N

S. NO	PATIENTS NAME	MRD NO.	INTRAOP -BLEED FROM ADJ TISSUES	BLD FROM CYSTIC ARTERY	CBD INJURY	IATROGENIC GB PERF	BLD FROM PORT SITES	GALL STONES SPILLAGE	BOWEL INJURY	POST OP BLEED ABDO WALL	BILE LEAK	SUBHEP COLLECTION	HEMATOMA ABDO WALL	PULM COMPLICATIONS	LOST GALL STONE ABSCESS	SSI	MORTALITY
1	SD	662120	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
2	AS	659240	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y
3	LD	643456	y	N	N	y	N	y	N	N	y	N	N	y	N	N	N
4	KD	54534	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
5	AS	662312	N	N	N	N	N	N	N	N	Y	Y	N	Y	N	N	N
6	BK	47470	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
7	JS	617525	y	N	N	y	N	y	N	N	y	N	N	y	N	N	N
8	RS	616934	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
9	RK	279002	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
10	B	618455	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
11	GK	636158	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
12	US	826197	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N
13	JR	827615	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
14	SK	818175	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
15	BS	641249	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
16	DC	656749	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
17	RB	628204	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
18	KS	624320	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
19	SPK	358920	N	Y	N	N	N	N	N	N	N	Y	N	N	N	N	N
20	SD	662120	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
21	J	629603	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
22	BD	404381	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
23	S	385477	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
24	SA	871897	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
25	BD	159392	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
26	KK	817296	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
27	S	619192	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
28	RS	166893	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
29	MK	629917	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
30	PC	620174	Y	N	N	Y	N	N	N	N	N	N	N	N	N	N	N
31	AK	578032	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N
32	RK	924006	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
33	SS	768667	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
34	RG	773377	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
35	SK	766859	Y	N	N	N	N	Y	N	N	N	N	N	N	N	N	N
36	TS	932627	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
37	GS	918698	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N
38	NS	656129	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N
39	GK	925944	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
40	M	628294	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
41	HS	640053	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
42	MR	643956	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
43	JK	635451	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
44	P	626049	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N
45	R	616934	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
46	S	619192	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
47	RK	279002	Y	N	N	Y	N	N	N	N	N	N	N	N	N	N	N
48	RS	166893	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
49	PR	896401	N	N	N	Y	N	Y	N	N	N	N	N	N	N	N	N
50	RK	874303	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
51	MK	892676	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
52	AS	659240	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
53	SS	440019	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
54	KR	561126	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
55	MK	645096	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

S. NO	PATIENTS NAME	MRD NO.	INTRAOP -BLEED FROM ADJ TISSUES	BLD FROM CYSTIC ARTERY	CBD INJURY	IATROGENIC GB PERF	BLD FROM PORT SITES	GALL STONES SPILLAGE	BOWEL INJURY	POST OP BLEED ABDO WALL	BILE LEAK	SUBHEP COLLECTION	HEMATOMA ABDO WALL	PULM COMPLICATIONS	LOST GALL STONE ABSCESS	SSI	MORTALITY
56	HS	32181	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
57	BK	672369	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
58	KS	801454	Y	Y	N	N	N	N	N	N	y	Y	N	N	N	N	N
59	SC	690575	N	N	Y	Y	N	N	N	N	N	Y	N	N	N	N	N
60	RK	946228	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
61	SS	635476	y	y	N	N	N	N	N	N	N	N	N	N	N	N	N
62	SK	621938	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
63	GK	201964	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
64	SR	813764	Y	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
65	PS	840133	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
66	DG	686636	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
67	AM	339056	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
68	SR	514681	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
69	JK	680314	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
70	KS	801454	Y	Y	N	N	N	N	N	N	Y	Y	N	N	N	N	N
71	MH	823786	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
72	JK	758170	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
73	GL	823165	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N
74	RK	653473	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
75	MR	643957	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
76	HS	32181	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
77	KC	339720	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
78	SK	853841	N	Y	N	Y	N	N	N	N	N	N	N	N	N	N	N
79	AG	840180	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
80	AKM	840189	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
81	MK	853827	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
82	MG	853436	N	Y	N	Y	N	N	N	N	N	N	N	N	N	N	N
83	BS	652577	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
84	RK	841080	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N
85	NL	629662	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
86	SS	619448	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
87	CK	663782	N	N	N	N	N	N	N	N	N	Y	N	N	N	N	N
88	KD	627492	N	N	N	N	N	N	N	N	Y	N	N	N	N	N	N
89	VB	645274	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
90	US	643789	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
91	RK	654234	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
92	RL	657759	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
93	RA	259712	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
94	JS	659940	Y	Y	N	Y	N	N	N	N	N	N	N	N	N	N	N
95	TK	676004	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
96	KS	672967	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
97	RV	245238	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
98	MK	658003	Y	N	N	N	N	Y	N	N	N	Y	N	N	N	N	N
99	VS	646404	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
100	BJ	676746	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

6839
24/08/2020

BABA FARID UNIVERSITY
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Faridkot-151 203 (Pb). India
Phone:01639-256232, 256236
Fax: 01639-256235

No.08 BFUHS 6888 Date 20/8/2020

The Principal
Dayanand Medical College,
Ludhiana

Subject: **Change and Delete of Co-Supervisor**

This is in reference to your office on the above mentioned subject. In this connection, you are informed that the Worthy Vice Chancellor has very kindly accepted your recommendations and appointed new Supervisor & Co-supervisor as mentioned below.

Name of Student/	Specialty	Existing Guides	Proposed Guides
Dr. Arshnoor Kaur	General Surgery	**Supervisor:** Dr. Sanjeev K. Singla Prof., Dept. of Surgery, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Jaspal Singh Prof. & Head, Dept. of Surgery, DMCH, Ludhiana.	**Supervisor:** Dr. Sanjeev K. Singla Prof., Dept. of Surgery, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Jaspal Singh Prof. & Head, Dept. of Surgery, DMCH, Ludhiana. Dr. Munish Trehan Assoc. Prof., Dept. of Surgery, DMCH, Ludhiana.
Dr. Nitika Singla /	Anaesthesiology	**Supervisor:** Dr. Sunil Katyal Prof. & Head, Dept. of Anaesthesiology, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Kamakshi Garg Assoc. Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. Dr. Ashima Taneja Prof. & Head, Dept. of Obst. & Gynae., DMCH, Ludhiana.	**Supervisor:** Dr. Kamakshi Garg Assoc. Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Anju Grewal Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. Dr. Ashima Taneja Prof. & Head, Dept. of Obst. & Gynae., DMCH, Ludhiana.

All conc
24/8/20

Dr. Richa /	Anaesthesiology	**Supervisor:** Dr. Sunil Katyal Prof. & Head, Dept. of Anaesthesiology, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Mirley Rupinder Singh Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. Dr. Namrata Assoc. Prof., Dept. of Anaesthesiology, DMCH, Ludhiana.	**Supervisor:** Dr. Dinesh Sood Prof. & Head, Dept. of Anaesthesiology, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Mirley Rupinder Singh Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. Dr. Namrata Assoc. Prof., Dept. of Anaesthesiology, DMCH, Ludhiana.

The student may be requested to attach photocopy of this letter along with plan approval letter while submitting thesis in the university. All concerned may also be informed accordingly.

Dr. S P Singh, MS (Oph)

Controler of Examinations

Baba Farid University
of Health Sciences
Sadiq Road
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Tele/Fax : 01639-256235
Email – Examination@bfuhs.ac.in

No. BFUHS/2K19p-TH/ 10407 Date 9/12/19

The Principal,
DMC, Ludhiana.

Subject: **Approval of Plan of Thesis.**

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.05.2019 has approved the plan of thesis of **Arshnoor Kaur**, a student of your college for **MS General Surgery** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis

Study on outcome of acute cholecystitis

Supervisor
Dr. Sanjeev K. Singla
Prof.,
Dept. of Surgery,
DMCH, Ludhiana.

Co-Supervisor
Dr. Jaspal Singh
Prof. & Head,
Dept. of Surgery,
DMCH, Ludhiana.

The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

S P Singh

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

1. *If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.*
2. *The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.*

STUDY ON OUTCOME OF ACUTE CHOLECYSTITIS

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF SURGERY

in

GENERAL SURGERY

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

NOVEMBER, 2018

Dr. ARSHNOOR KAUR

DEPARTMENT OF GENERAL SURGERY
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA
LUDHIANA, PUNJAB-141001

ABSTRACT OF PLAN OF THESIS

Title	STUDY ON OUTCOME OF ACUTE CHOLECYSTITIS
For the degree of	M.S. Surgery
Name of the candidate	Dr Arshnoor Kaur
Supervisor	Dr. Sanjeev K Singla, Professor, Department of Surgery, DMCH, Ludhiana
Co-supervisor	Dr. Jaspal Singh, Professor & Head, Department of Surgery, DMCH, Ludhiana
Institution	Dayanand Medical College and Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: A Prospective study on outcome of acute cholecystitis and plan of therapy based on certain parameters which decide the severity gradings such as mild , moderate or severe acute cholecystitis according to Tokyo Guidelines(TG13).Detailed Tokyo guidelines (TG13) will be discussed later.

Aim of study:

i. To determine the outcome in patients with Acute Cholecystitis.

Materials and methods: Patients of either sex adults presenting to DMCH from 1st Nov ,2018 to 31st Oct ,2019 with the diagnosis of acute cholecystitis enrolled and assessed on the basis of plan of therapy (percutaneous transhepatic gallbladder drainage /cholecystectomy) and their outcomes according to Tokyo guidelines 2013 (TG13).

Clinical significance: Study will conclude the appropriate time of approach and the best possible therapy (percutaneous transhepatic gallbladder drainage /cholecystectomy) and the best outcome available according to the severity gradings.

Keywords: Severity gradings, co-morbidities,tokyo guidelines 2013.

(Signature) Candidate	(Signature) Co-supervisor	(Signature) Supervisor	(Signature) Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled **"STUDY ON OUTCOME OF ACUTE CHOLECYSTITIS"** exist in the Department of General Surgery at Dayanand Medical College and Hospital, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate herself under our supervision and guidance.

Supervisor

Dr Sanjeev K Singla
Professor
Department of Surgery
DMCH, Ludhiana

Co-Supervisor

Dr Jaspal Singh
Professor & Head
Department of Surgery
DMCH, Ludhiana

Dr Jaspal Singh
Professor & Head
Department of Surgery
DMCH, Ludhiana

Place : DMCH, LUDHIANA

Date : 30/11/18

APPROVAL PROFORMA
BY
RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

Name of candidate	Dr. Arshnoor Kaur
Department	General Surgery
Topic of Thesis	STUDY ON OUTCOME OF ACUTE CHOLECYSTITIS
Likely date of appearing in PG examination	MAY 2021
Date of enrollment	MAY 10, 2018
Name of Head of Department	Dr. Jaspal Singh
1) Supervisor **2) Co-Supervisor**	Dr. Sanjeev K Singla Dr. Jaspal Singh
Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
1. HOD Pharmacology	1. HOD Physiology
2. HOD Surgery	2. HOD Pathology
3. HOD Pathology	3. HOD Pharmacology
4. HOD Medicine	4. HOD SPM
5. Dean Academics	5. HOD Medicine
6. Vice Principal	6. HOD Surgery
	7. HOD Obst. & Gynae
	8. Legal Expert
	9. Secretary, IEC
	10. Dean Academics
	11. Vice Principal
	12. Principal

Approved: Yes / No

Chairperson
Research Committee
Chairperson
Research Committee

Approved: Yes / No

Chairperson
Ethics Committee
Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	DR. ARSHNOOR KAUR 215-A MODEL TOWN EXTENSION LUDHIANA.
2	NAME OF THE INSTITUTE	DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA
3	COURSE OF STUDY AND SUBJECT	M.S. GENERAL SURGERY
4	DATE OF ADMISSION OF COURSE	10th MAY,2018
5	TITLE OF THE TOPIC	STUDY ON OUTCOME OF ACUTE CHOLECYSTITIS

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Gallstones are common and present as acute calculus cholecystitis (ACC) in 20 % of patients with symptomatic disease, with wide variation in severity. In developed countries, 10–15 % of the adult population is affected by gallstones. According to the third National Health and Nutrition Examination Survey, 6.3 million men and 14.2 million women aged 20 to 74 in the United States had gallbladder disease.[1] In Europe, the Multicenter Italian Study on Cholelithiasis (MICOL) examined nearly 33,000 subjects aged 30 to 69 years in 18 cohorts of 10 Italian regions. The overall incidence of gallstone disease was 18.8 % in women and 9.5 % in men.[2] However, the prevalence of gallstone disease varies significantly between ethnicities.

Biliary colic occurs in 1 to 4 % annually. ACC occurs in 10 to 20 % of untreated patients.[3] In patients discharged home without operation after ACC, the probability of gallstone related events is 14, 19, and 29 % at 6-weeks, 12 weeks, and at 1 year, respectively. Recurrent symptoms involve biliary colic in 70 % while biliary tract obstruction occurs in 24 % and pancreatitis in 6 %.[4] Despite the relevant frequency of ACC, significant controversies remain regarding the diagnosis and management of ACC. The 2007 and 2013 Tokyo guidelines (TG) attempted to establish objective parameters for the diagnosis of ACC. However debates continue in the diagnostic value of single ultrasound (US) signs, as well as of laboratory tests. With regard to the treatment of ACC, historically, the main controversies were around the timing of surgery. The need for surgery as compared to conservative management has been less investigated, particularly in high

surgical risk patients. The other major disagreements include: method and need to diagnose potential associated biliary tree stones during ACC, treatment options, type of surgery, definition and management of high surgical risk patients (with clarification of the role for cholecystostomy). While the TG have certainly improved the understanding of ACC, some criticisms have followed. Indeed, the references in the TG are outdated for some recommendations; the ACC scoring system has not been validated and it does not distinguish between suspected gallbladder inflammation and systemic signs of ACC. Finally, the conclusions are not clear because all the different therapeutic options are available for the same "cholecystitis severity grade".

6.2 REVIEW OF LITERATURE

THE TOKYO GUIDELINES 2007 [4,5] was issued as the first international guidelines and treatment of AC; recently, it was revised to the Tokyo Guidelines 2013 (TG 13). The Tokyo guidelines 2013 suggests criteria for classification of AC based on clinical symptoms and physical blood test, and imaging findings. According to the TG13, AC is classified into three grades: Grade I (mild), grade II (moderate), and grade III (severe).Patients with grade I AC are candidates for undergoing immediate LC, those with grade II AC can undergo either early LC or percutaneous transhepatic gallbladder drainage (PTGBD), and those with grade III AC are strongly recommended to undergo immediate PTGBD.

The study by A.A. Hatzidakis et al [6] was randomized and comprised 123 high-risk patients with acute cholecystitis. All patients fulfilled the ultrasonographic criteria of acute inflammation and had an APACHE II score ≥12. Percutaneous cholecystostomy guided by US or CT was successful in 60 of 63 patients (95.2%) who comprised the PC group. Sixty patients were conservatively treated (CO group). One patient died after unsuccessful PC (1.6%). Resolution of symptoms occurred in 54 of 63 patients (86%). Eleven patients (17.5%) died either of ongoing sepsis (n=6) or severe underlying disease (n=5) within 30 days. Seven patients (11%) were operated on because of persisting symptoms (n=3), catheter dislodgment (n=3), or unsuccessful PC (n=1).

In a study conducted by Boland et al [7] eighty-two patients, 44 men and 38 women 32-88 years old (mean age, 62 years), with sepsis of unknown origin underwent percutaneous cholecystostomy because of clinical concern that the

gallbladder might be the source of sepsis. No other source of infection was found in 63 of 82 patients. In 48 (59%) of 82 patients, significant improvement was shown in the clinical condition within 48 hrs, including defer- vescence (41 patients), disappearance of abdominal pain or tenderness (27), WBC count returning to normal (33), and the ability to discontinue vasopressor therapy. Twelve patients who initially responded to percutaneous cholecystostomy subsequently died of multiorgan failure and or sepsis 2-37 days (mean, 16 days; median, 18 days) after the procedure. Cholecystectomy, after recovery from the acute illness, was electively performed in 16 of 48 patients who responded to percutaneous cholecystostomy. Of these 16 patients, cholecystectomy was the definitive therapy for gallstones in only six.

445 patients with acute cholecystitis were studied by Paul Wright G et al [8] for all patients, length of stay ($P < 0.001$), disposition to home ($P < 0.001$), and morbidity ($P = 0.003$) were related to increasing severity grade of acute cholecystitis. For surgical patients ($n = 256$), worsened outcomes with increasing severity grade were seen for conversion to open ($P = 0.001$), operative duration ($P < 0.001$), length of stay ($P < 0.001$), disposition to home ($P < 0.001$),and readmission ($P = 0.037$). The recurrence of acute cholecystitis while patients are waiting for cholecystectomy following conservative treatment ranges from 2.5% to 22%. In 311 patients with acute calculous cholecystitis, 25 of 39 patients who did not have a cholecystectomy during the acute stage were scheduled to undergo delayed operation after being discharged from hospital. Only 1 of the 25 patients (2.5%) developed recurrent acute cholecystitis while waiting for an operation. In non-severe

cases, acute cholecystitis recurred in 2% of patients within an 8- to 10-week waiting period, 6% of whom showed gallbladder perforation. In patients with acute cholecystitis who were observed after treatment with percutaneous drainage, acute cholecystitis recurred once or more in 28 of 60 patients (47%) during an average observation period of 18 months, and it recurred once or more in 11 of 36 (31%) patients who were observed for 37 months on average. In a report of 114 patients who underwent only cholecystostomy, among 585 patients who were hospitalized because of acute cholecystitis, acute cholecystitis recurred in 5 of 23 patients observed for 6 months to 14 years and 14 of the 23 patients remained asymptomatic.[9,10]

In Tunisia,[11] the spread of the TG has increased the rate of LC, significantly reducing preoperative and total hospital stay without increasing intra- and postoperative complications; in Taiwan, Cheng et al. mentioned the complication rate and the length of hospital stay increased along with the severity grade of the TG; and in Japan, too, a significant correlation has been reported between severity grade and both prolonged postoperative hospital stay and medical cost.

Thirty-two PCs were performed in thirty patients by W Al–Jundi et al- 2012 (mean age: 76.1 years; range: 52–90 years).[12] The indications for PC were acute calculous cholecystitis (29/32), acalculous cholecystitis (1/32) and emphysematous cholecystitis (2/32). The route of insertion was transperitoneal for 22/32 PCs (68.8%) and transhepatic for 10/32 (31.2%). The procedure was technically successful in all patients although 2/22 transperitoneal drains (9.1%) were dislodged subsequently. Twenty-seven PCs (84.4%) resulted in clinical improvement within five days. The in-hospital

or 30–day mortality rate was 16.7% (5/30). Eleven patients (36.7%) had a subsequent cholecystectomy: 6 were laparoscopic and 5 converted to open procedures at a median interval of 58 days (range: 1–124 days).

Wei-Chun Cheng et al [13] took a total of 103 patients with acute cholecystitis were retrospectively enrolled and their medical records were reviewed. They were all classified according to therapeutic modality, including early cholecystectomy and antibiotic treatment with or without percutaneous cholecystostomy. The impact of the Tokyo guidelines and the presence of comorbidities on clinical outcome were assessed by univariate and multivariate regression analyses. According to Tokyo severity grading, 48 patients were Grade I, 31 patients were Grade II, and 24 patients were Grade III. The Grade III patients had a longer hospital stay than Grade II and Grade I patients (15.2 days, 9.2 days, and 7.3 days, respectively, $p < 0.05$

KS Gurusamy et al [14] included two trials with 156 participants for this review. The comparisons included in these two trials were percutaneous cholecystostomy followed by early laparoscopic cholecystectomy versus delayed laparoscopic cholecystectomy (1 trial; 70 participants) and percutaneous cholecystostomy versus conservative treatment (1 trial; 86 participants). Both trials had high risk of bias.

Percutaneous cholecystostomy with early laparoscopic cholecystectomy versus delayed laparoscopic cholecystectomy.[15-18] There was no significant difference in mortality between the two intervention groups (0/37 versus 1/33; Fisher's exact test: P value = 0.47). There was no significant difference in overall morbidity between the two intervention groups (1/31 versus 2/30; Fisher's exact test: P value = 0.61). This trial did not report on quality of life.

There was no significant difference in the proportion of participants requiring conversion to open cholecystectomy between the two intervention groups (2/31 percutaneous cholecystostomy followed by early laparoscopic cholecystectomy versus 4/30 delayed laparoscopic cholecystectomy; Fisher's exact test: P value = 0.43). The mean total hospital stay was significantly lower in the percutaneous cholecystostomy followed by early laparoscopic cholecystectomy group compared with the delayed laparoscopic cholecystectomy group (1 trial; 61 participants; MD -9.90 days; 95% CI -12.31 to -7.49).

PC is an effective tool with a high success rate and low morbidity and facilitates safe subsequent surgical treatment, especially for LC. Some surgeons prefer preoperative PC before LC based on the results of previous studies indicating that elective cholecystectomy after PC may lower the conversion and complication rates of patients with complicated AC. However, several recent studies have reported that PC is associated with increased 30-day mortality, higher odds of death, higher morbidity rates, and higher total costs compared with cholecystectomy.[18-20]

The recommendation given by Takada et al [9] for PC in cases of severe (grade III) AC is generally accepted in clinical practice. In some institutes, preoperative PC may be performed based on the physician's preference or as an arbitrary indication based on the hospital's policy for delayed surgery rather than according to AC severity grade, especially for moderate or mild AC. In the present study, PC was performed in about 27% of patients in the mild (grade I) group and 55% of patients in the moderate (grade II) group. In addition, with respect to moderate AC, the decision to perform PC may

depend largely on the patient's age, comorbidities, and ASA score rather than their response to initial medical management.[20]

PC was performed in patients with advanced age over 65 years, comorbidities, and higher ASA score in both mild and moderate AC groups. However, in the moderate AC group, PC was performed not only for patients who did not respond to conservative management, but also for those who responded to initial medical management. In this case, the decision to perform PC depended largely on the physician's discretion.[19]

Complications are also significantly more common for patients at higher severity grades. A study of intraoperative bile duct injury also found that complications occurred significantly more often in higher-grade cases.[21] Postoperative pathological findings of gangrenous cholecystitis and emphysematous cholecystitis have been found to be more severe in higher-grade cases.[22] The only study of medical costs so far performed is a Japanese study that found that medical costs are significantly higher in higher-grade cases.

6.3 AIMS AND OBJECTIVES OF THE STUDY

To determine the outcome in patients with Acute Cholecystitis.

7.0 MATERIAL AND METHODS

7.1 SOURCE OF DATA

Patients admitted to general surgery ward in our hospital with diagnosis of Acute Cholecystitis from 1st Nov, 2018 to 31st Oct ,2019 enrolled and classified using severity grading according to Tokyo guidelines 2013.

7.2 METHOD OF COLLECTION OF DATA

Inclusion criteria:

- Acute cholecystitis
- Complicated acute cholecystitis
- Acute on chronic cholecystitis
- Age >18 years old
- Concomitant cholangitis or mild pancreatitis (according to Atlanta classification)
- More than one management within one admission or subsequent admissions
- Acalculous cholecystitis

Exclusion criteria:

- Age <18 years old
- Hepatobiliary malignancy
- Moderate and severe pancreatitis (Atlanta classification)

Patient diagnosed based on typical physical findings, systemic inflammation signs, and abdominal imaging (abdominal ultrasonography and / or computed tomography).Based on treatment modality, we selected the patients with less severity and fewer comorbidities for cholecystectomy and Percutaneous Cholecystectomy in critically ill patients. The decision to perform

percutaneous cholecystostomy was made if the patient had persistent fever, severe pain, dyspnea, unstable hemodynamics, or conscious disturbance despite the use of antibiotics.

The criteria used is as follows:

Table 2. Severity Grading for Acute Cholecystitis, According to Tokyo Guidelines.*

Grade	Criteria
Mild (grade 1)	Acute cholecystitis that does not meet the criteria for a more severe grade Mild gallbladder inflammation, no organ dysfunction
Moderate (grade 2)	The presence of one or more of the following: Elevated white-cell count (>18,000 cells per cubic millimeter) Palpable, tender mass in the right upper quadrant Duration >72 hr Marked local inflammation including biliary peritonitis, pericholecystic abscess, hepatic abscess, gangrenous cholecystitis, emphysematous cholecystitis
Severe (grade 3)	The presence of one or more of the following: Cardiovascular dysfunction (hypotension requiring treatment with dopamine at ≥5 μg per kilogram of body weight per minute or any dose of dobutamine) Neurologic dysfunction (decreased level of consciousness) Respiratory dysfunction (ratio of partial pressure of arterial oxygen to the fraction of inspired oxygen <300) Renal dysfunction (oliguria; creatinine level, >2.0 mg/deciliter) Hepatic dysfunction (prothrombin time–international normalized ratio, >1.5) Hematologic dysfunction (platelet count, <100,000 per cubic millimeter)

A.Surgical procedure done :

- Laparoscopic cholecystectomy
- Conversion to open cholecystectomy
- Open cholecystectomy
- Percutaneous cholecystostomy
- PC f/b interval cholecystectomy

B.Complications:

Intraoperative complications:

- Bleeding from tissues adjacent to gall bladder
- Bleeding from cystic artery
- Iatrogenic perforations of gall bladder
- CBD injury
- Bleeding from anterior abdominal wall (port)
- Spilled gall stones
- Bleeding from ligaments of liver
- Colonic injury

Postoperative complications (BTW POD 1 – 7)

- Bleeding from abdominal wall cavity >100ml/24hrs
- Bile leak(>50/100) ml /24hrs
- Subhepatic collection
- Hematoma abdominal wall
- Recurrence of symptoms
- Pulmonary complications
- Lost gall stones(abscess)
- Surgical site infection

C.Postoperative hospital stay length

Duration of study: Patient admitted in DMCH, Ludhiana with Acute Cholecystitis in one year of time period i.e. from 1st Nov, 2018 to 31st Oct, 2019.

Outcome: This study will evaluate and assess the duration of postoperative hospital/ICU stay, mortality/morbidity rates, local/systemic complications and

medical costs for patients with definite diagnosis of Acute Cholecystitis according to Tokyo Guidelines 2013.

Statistical Analysis: Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. Comparison of quantitative variables between the study groups will be done using ANOVA test. For comparing categorical data, Chi square ($\chi 2$) test will be performed and exact test was used when the expected frequency is less than 5. A probability value (*p* value) less than 0.05 will be considered statistically significant. All statistical calculations will be done using SPSS (Statistical Package for the Social Science) SPSS 21 version statistical program for Microsoft Windows.

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEF?

This study does not require any investigation but does require surgical intervention, less invasive technique percutaneous cholecystostomy in critically ill grade III patients or early cholecystectomy in grade I and II patients.

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Attached along with here.

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PROFORMA

Serial No. MRD NO.:

Name:

Husband's/Father's Name: Admission No.-

Age & Sex: Date of Admission:

Address : Occupation :

Chief complaints :

General Physical Examination:

Pulse: BP: Respiratory Rate: Temp:

P/A-local signs

1.Murphy 's sign-

2.Pain or tenderness in RUQ-

3.Mass in RUQ-

Systemic signs-

1.Fever

2.Leucocytosis

INVESTIGATIONS:

TLC : DLC : RBS:

TOTAL BILIRUBIN i DIRECT : ii INDIRECT:

SGOT: SGPT: ALP:

SERUM AMYLASE : SERUM LIPASE:

BLOOD UREA : SERUM CREATININE:

Signature of supervisor Signature of candidate

IMAGING FINDINGS ON

USG ABDOMEN :

CT ABDOMEN(if required):

Grade	Severity	Present	Absent
I (mild)	• Acute cholecystitis in a healthy patient with no organ dysfunction • Mild inflammatory changes in the gallbladder		
II (moderate)	Any one of the following conditions: • Elevated WBC count (>18,000/mm^3) • Palpable tender mass in the right upper abdominal quadrant • Duration of complaints >72 h • Marked local inflammation including: Gangrenous cholecystitis, Pericholecystic abscess, Hepatic abscess, Biliary peritonitis, Emphysematous cholecystitis		
III (severe)	Acute cholecystitis is associated with dysfunction of any one of the following organs/systems: • Cardiovascular dysfunction • Neurological dysfunction: • Respiratory dysfunction: • Renal dysfunction: • Hepatic dysfunction: • Hematological dysfunction:		

Grade of Acute Cholecystitis acc to Tokyo guidelines 2013:

Surgical procedure (laparoscopic/conversion to open/ open/ percutaneous Cholecystostomy / PC f/b interval cholecystectomy)-

Intraop clipping done(y/n)-

Signature of supervisor

Signature of candidate

Blood loss -

Histopath of gall bladder-

Intraoperative Complications:(Y/N)

- Bleeding from tissues adjacent to gall bladder:
- Bleeding from cystic artery :
- Iatrogenic perforations of gall bladder:
- CBD injury:
- Bleeding from anterior abdominal wall (port):
- Spilled gall stones:
- Bleeding from ligaments of liver:
- Colonic injury:

Postoperative Complications(BTW POD 1 – 7):(Y/N)

- Bleeding from abdominal wall cavity >100ml/24hrs:
- Bile leak(>50/100) ml /24hrs:
- Subhepatic collection :
- Hematoma abdominal wall:
- Recurrence of symptoms:
- Pulmonary complications:
- Lost gall stones(abscess):
- Surgical site infection:

Postop Hospital Stay Length:

Signature of supervisor

Signature of candidate

INFORMED PATIENT CONSENT

Date: _____

I.....D/o, W/o, S/o..... .....am willing to participate in the study "**STUDY ON OUTCOME OF ACUTE CHOLECYSTITIS"** The procedure with its complications has been explained to me in local vernacular language. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

.....
Signature of the Witness

Name:

.....
Signature of the patient

Signature of Candidate

Signature of Supervisor

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____

निवासी _____

इस शोधकार्य **"STUDY ON OUTCOME OF ACUTE CHOLECYSTITIS"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____

गवाह के हस्ताक्षर

नाम:

_____

रोगी के हस्ताक्षर/अंगूठे का निशान

नाम:

_____

अन्वेषक के हस्ताक्षर

_____

विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

"STUDY ON OUTCOME OF ACUTE CHOLECYSTITIS" ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ।

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

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ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ

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ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____

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ਪਤਾ _____

ਪਤਾ _____

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ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

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ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ